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Machine for Rifling Gun Barrels.

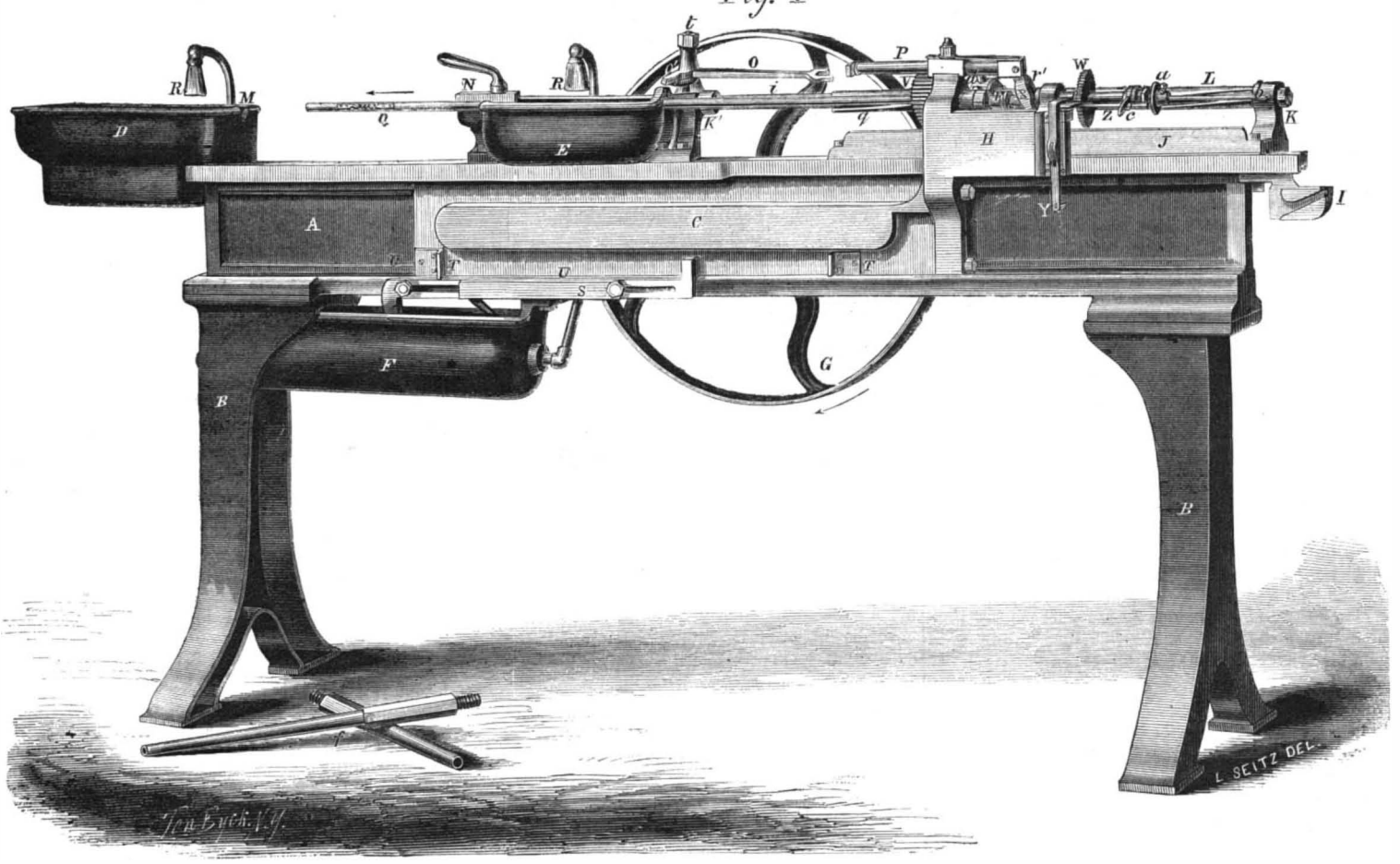
The process of rifling musket barrels is an extremely delicate and intricate one, and it requires the nicest machinery as well as the most careful adjustment of the work. As the rifling is the last operation of any importance done upon the musket *barrel*, it is obvious that the whole job will be condemned if it fails in this one particular.

The machine herewith illustrated is very highly recommended for efficiency, cheapness, simplicity of construction, and rapidity of execution. We have before us a printed circular which contains the names of some of the most prominent musket-makers and private armories in New York and other States, and these all concur in a favorable opinion of this machine. The following description will enable all persons to understand it by referring to each view:—

To rifle a barrel, a number of cuts are taken its whole length each time; to give the proper twist, the rifling rod requires a continuous reciprocating and partially-rotating motion combined, and at the end of each cut has to be revolved, to commence the next groove. The cutters are to be fed outward, before, and relieved after each cut; and if the grooves are to be of unequal depth, the feed must vary during the cut. The cutters are also to be thoroughly lubricated at the end of each stroke. From this description the reader will see that the inventor has no easy task when he undertakes to devise a machine of this kind.

Fig. 1 is a perspective view of the machine for rifling carbine musket barrels. Fig. 2 shows a sectional elevation, taken through the driving shaft.

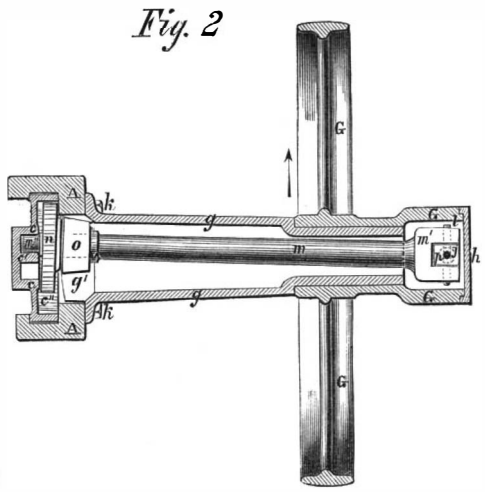
Fig. 1



POWERS'S MACHINE FOR RIFLING GUN BARRELS.

The frame or bed, A, supported by the legs, B B, is grooved to receive the rack-box, C, inclosing two parallel racks, C″, connected at the ends by semi-circular segments, and together forming a continuous line of internal gear, within which and parallel to it is a square groove. The hollow arm, *g g′*, is secured to the frame, A A, by bolts, *k k*, and supports at its outer end the driving wheel, G, which freely revolves upon

Fig. 2



it. The driving shaft *m m′ m″*, carrying the pinion, *n*, is connected to this wheel by the universal joint, made up, in the usual manner, of the jaw, *m′*, pin, *l*, piece, *p*, and screws, *j* (one of which is not shown), and vibrates in a vertical plane; the box, *o*, through which it passes, being held between two vertical faces, one of which, *g′*, is shown. *h* is a plain cap inserted in G. The end, *m*, of the driving shaft revolves in the grooves, the racks and pinions are kept thereby constantly in contact and the necessary reciprocating motion is imparted to the rack-box. The frame or head, H, is attached to the rack-box, and carries the rifling rod and feed arrangements.

The barrel to be operated upon is fastened at M N, by the clamp, N, at the butt, and is not shown in place—the engraving representing a view from muzzle to butt. The barrels for which the machine herewith described was made, are about 28 inches long; two are shown at *f*, under the machine.

The rifling rod and cutters are of the usual form; the rod is attached to the spindle, *q*. Both are hollow and hold the feed wire, *b*, the end of which, at Q, is conical, and bears against the three cutters, held in slots of the rifling rod by springs. Sliding within this hollow spindle, and revolving with it, by slot and feather, is another hollow spindle, *r r′*, which carries the ratchet nut, W. This nut revolves around *r r*, without any lateral movement, and takes hold of a threaded piece held in a slot of *r r′*, and also clamped to the feed wire, *b*. The sliding pawl, Y, operated at the end of each cut by the incline, I, revolves the nut and thereby, through the agency of the feed wire, forces the cutters out for the next cut; this continues until the button, *a*, also clamped on the feed wire, strikes the pin, *c*, on the spring, Z, which throws up the pawl and the feed is stopped.

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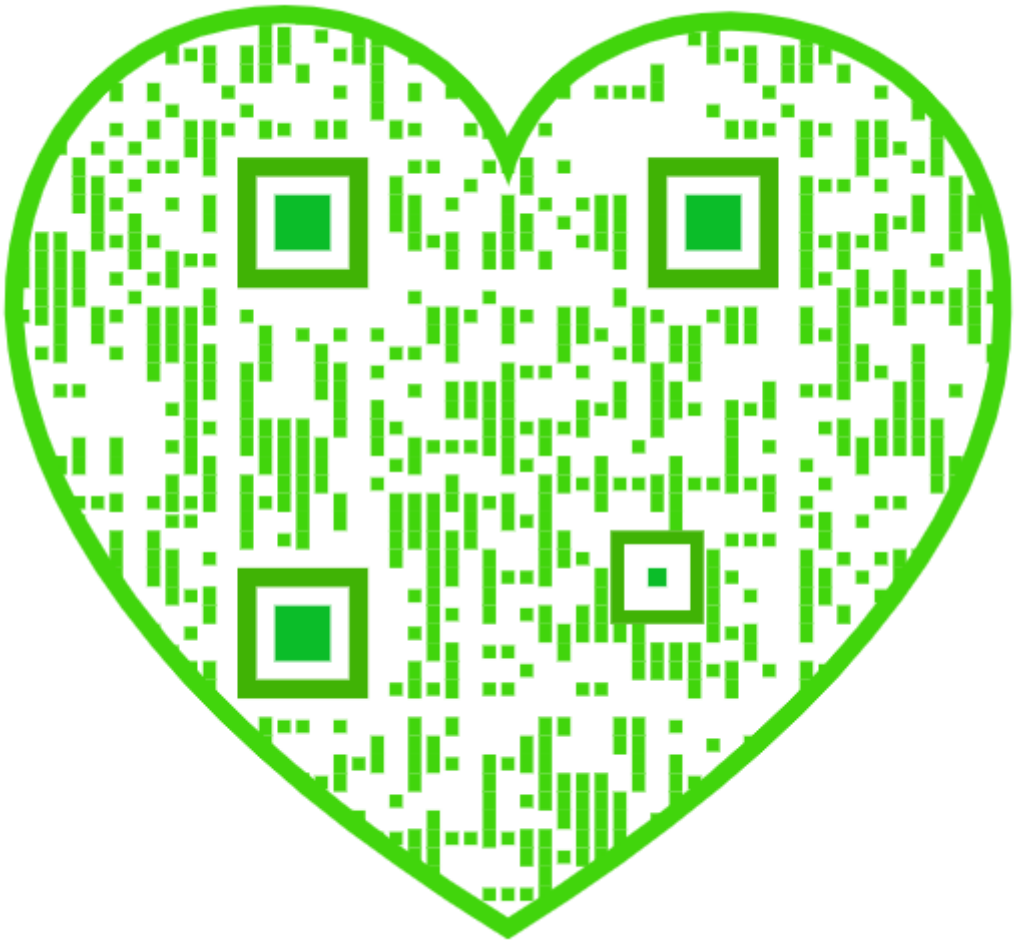

The forked swinging piece, X, at one extremity, suspended from the frame, H, and with the other traversing the incline, J, embraces the spindle, *r r'*, between two collars and by contact with one or the other, gives a reciprocating motion to the spindle and feed wire, and thereby thrusts forward the cutters or relieves them; the incline, J, being short enough to permit the swinging piece, X, to drop over the ends. and change from one side of the vertical to the other, as the movement of the rifling rod changes.

The guide rod, L, fastened to the frame, A at K and K', is cut in grooves of the same inclination, as those to be cut in the barrel, but in an opposite direction. A sleeve or nut, V, revolving in a bracket of the frame, H, traverses the guide rod, and by the gears, *v* (which are both of the same size), upon it and the spindle, *q*, communicates the proper spiral motion to the rifling rod, as it passes through the barrel. The rod is revolved from one groove to the next while projecting beyond the muzzle end of the barrel, by the stud, P, on the frame, H, pressing against the short arm, *o'*, of the bell-crank lever, *o o'*, while the long-forked arm, *o*, embraces a pin on the trundle-head, *d*, of the nut, V, and causes it to partially revolve around the guide rod at *i*; the grooves being cut away there for that purpose. As the pressure is removed by the return of the frame, a spring causes the lever to resume its former position.

The reservoir, F, contains a small pump, without valves, worked by the rod, S, sliding upon pins, U U; to this rod a short intermittent reciprocating movement is given by the projections, T T, on the rack-box, C, thus discharging alternately through the pipes, R R, a jet of oil upon the cutters, as they project from either end of the barrel, The oil and cuttings are collected in the pans, D E, from which the oil filters through the tubes, *e e*, to the reservoir, to be again used.

The machines have been thoroughly and practically tested, and are superior for simplicity of design, compact form and quick adjustment; in cheapness, durability, quality and quantity of work, and economy of working, they are not surpassed. This machine was patented by Titus Powers, Philadelphia, Pa., Dec. 2, 1862. For further information address by G. Leverich, sole agent and maker, Trenton, N. J.

INFLUENCE OF FOOD UPON THE INTELLECT.

Very few well-informed persons dispute the fact that the nature of the food taken by man has an influence upon his brain or mental power. It is unquestionable that certain kinds of food are injurious to beasts, and produce or tend to induce disease; and this peculiarity has a proportionate evil effect upon the animal part of man. Other matter taken into the system for refreshment or luxury, such as drink or narcotics, has also some influence upon the character of those who partake of it. National traits and characteristics are thus developed, and we see Germans and Hollanders heavy, slow thinkers, solid rather than brilliant, and given to sluggishness rather than bodily activity. Cannot the cause of this be found in the quantity of beer, tobacco and highly seasoned cookery which is consumed by the people; and may we not trace some of the prominent traits of the French character to the quality of the diet and drink they subsist on? Whatever conclusion we may arrive at (for the question is an open one and susceptible of much discussion), we may not venture to dispute the results of actual experiments on this subject, made by learned physicians; some account of their researches we append herewith:—

In the excellent work of Prof. Moleschott, of Zurich, *Lehre der Nahrungsmittel, fur das Volk*, the influence of diet on the intellect is dwelt upon at great length. "It is a well-known fact," says this philosopher, "that change of food has transformed the wild cat into the domestic fireside-companion, from a carnivorous animal, with short intestines, it has, by gradually becoming accustomed to other food, become transformed into another being, enabled by a long intestinal canal to digest vegetable food, which in its natural state it never touches. Food, therefore, makes the most rapacious and perfidious animal in the world an inmate with man, agreeing with children, and rarely, except to a close observer, revealing its former guileful character. Are we, then, to wonder that tribes of men become ardent, phlegmatic, strong or feeble, courageous or cowardly, thoughtful or unintelligent, according to the different kinds of aliments they take? If food is transformed into blood, blood into nerve and muscle, bone and brain, must not the ardor of the heart, the strength of the muscles, the firmness of the brain, the activity of the brain, be dependent upon the constituents of food?" Again, in treating of the diet of the artist and literary man, the author states that "a well-baked bread and lean meat, combined with young vegetables and such roots as are easy of digestion and contain a considerably proportion of sugar, form a wholesome diet for thinkers and poets; a large quantity of leguminous seeds, heavy bread, rich gravy, and greasy meat, create those irritable, morose, and almost always slender statesmen, who have permitted gloomy thoughts and gloomy imaginations to eclipse all happier views of life in them, or that they have come to consider rods and fetters as the most important promoters and protectors of civilization."

To the Reverend Professor Haughton of Trinity College, Dublin—a philosopher who has enlarged the boundaries of many departments of science—we are indebted for an admirable physiological investigation (published in the Dublin *Quarterly Journal of Medical Science*), the results of which have established the curious fact that the greatest or perhaps we should say the hardest thinker is the greatest eater.

Professor Haughton states that men employed in mere manual routine labor, require only a vegetable diet, whilst those who are engaged in pursuits requiring the constant use of the intellectual faculties must be supplied with food of a better kind—*i. e.*, mixed animal and vegetable aliments.

These interesting experiments of Professor Haughton open up a wide field of curious and interesting inquiry. Is vital activity a mere modification of chemical force, and is the explanation of all the phenomena of living beings to be found in the domains of chemistry and the various physical sciences? No doubt many of the changes which take place during the different stages in the life of an animal can be clearly traced to the unmodified action of the various physical agencies, but there are others which are not so easily explained, and which some physiologists refer to the operation of a force which they regard as distinct from all others, namely, the vital. It should, however, be remembered that this force, as it is called, never evidences its independent nature by any unaided manifestations of a material character. It has never been proved that any portion of matter, however small, has been caused to change its position in space by the sole agency of the vital power.

Mr. Grove suggests that the inorganic forces and animal force will yet be shown to be convertible into each other; but let this acute student of nature speak for himself:—

"Some difficulty in studying the correlations of vital with inorganic forces arising from the effects of sensation and consciousness, presenting a similar confusion to that alluded to when, in treating of heat, I ventured to suggest that observers are too apt to confound the sensations with the phenomena. Thus, to apply some of the considerations on force, given in the introductory portion of this essay, to cases where vitality or consciousness intervenes, where a weight is raised by the hand, there should, according to the doctrine of the non-creation of force, have been somewhere an expenditure equivalent to the amount of gravitation overcome in raising the weight. That there is expenditure we can prove, though in the present state of science we cannot measure it. Thus, prolong the effort, raise weights for an hour or two, the vital powers sink, food, *i. e.*, fresh chemical force, is required to supply the exhaustion. If this supply is withheld and the exertion is continued, we see the consumption of force in the supervening weakness and emaciation of the body."

The question next arises, how does the food, in the process of its decomposition, develop motive power? This is a question more easily asked than answered. We know that the grouping of atoms of matter into the organized forms, to which the terms starch, sugar, caseine, &c., have been given, was effected by plants, under the influence of sunlight. Such substances, there is reason to believe, should not be regarded merely as "consolidated masses of the atmosphere and water," but also as accumulations of force. When these substances are disorganized in the mechanisms of animals, the force which was previously pent up in them is set free; part of it takes the form of heat, a portion of it, occasionally (perhaps always) is resolved into electricity, and part is recognized as muscular power (animal motive power). The heat set free by the disorganization of food in the animal economy differs in no respect from that developed by the combustion of fuel in our furnaces; and by means of the electricity procurable from the torpedo every phenomenon peculiar to that variety of force can be exhibited. Now the inquiry presents itself here, are we to infer from these well-ascertained facts that vital action is the result of the conjoint influence of the ordinary physical (including chemical) agencies, modified by the peculiar state of aggregation of the atoms of matter on which they act; or that, in addition to the physical forces set free by the destruction of the animal mechanism and by the decomposition of the food, there is developed a peculiar force correlated to the physical forces, but differing in its manifestations from each of them in the same way that electricity differs from magnetism, or light from heat? To the latter view we are disposed to incline. We believe that all the forces of nature are but modified manifestations of the one all-pervading ætherial fluid (in a state of motion), and that the modifications arise, in most instances, from the differences in the nature of the ponderable matter on which this universal force acts.

It is generally to be regretted that a staple food of a large portion of the people of this country (England) is deficient in flavor and too bulky to be nutritious. We have long been of opinion that, in this country, at least, the best agricultural laborer is he who is best fed. Let us see what facts we can call upon in support of this opinion.

Oatmeal is the staple article of the food of the Scotch laborers, and of those of the northern parts of England, and its great superiority over the potato is strikingly manifest, when we compare the physical development of the consumers of the two alimental substances.

In the counties of York, Lancaster, Northumberland and Cumberland, the *physique* of the laborer is superior to that of the worker of any other part of England. But the northern laborer is not merely more powerful than his southern *confrere*, for he excels him in the exercise of his intellectual faculties. This is so well known to the farmers from the north of England, who have settled in other parts of that country, that they offer higher wages to the laborers from their own part of the kingdom; knowing well, from further experience of their habits, that they will not only do more but better work than the laborers of the south.

The cause of the superior intelligence, and greater physical powers of the common people of the north of England, as compared with those elsewhere, may in part be found in ethnological differences. But granting this, their maintenance would be impossible, were the food of the people of this district similar to that of the laborers of the English midland counties.

In the north of England and in Scotland, although potatoes are extensively consumed, yet buttermilk, which the people by no means despise, is also largely make use of; and oatcake is far from being a stranger on the poor man's board. In the south of England, oatmeal, whether served up in the semi-fluid form of porridge, or in the solid condition of cake, is almost unknown.

It requires no argument to prove that the people of the north of England are better agricultural laborers than those of the south, and are themselves excelled by their neighbors north of the Tweed. Although there is but little ethnological difference between the agricultural laborers of the south of Scotland and those of the north of England, it appears to me that the former possess more brains and muscles than the latter; they are stronger and more skillful workmen. We think, however, that no such difference is observable between the artizans of Glasgow and those of Newcastle or Carlisle. In the case of the rural workman this may appear anomalous, but it is not really so. The artizans of both countries are well paid, and can, therefore, afford to use a generous diet, composed chiefly of animal food; but the Scotch agricultural laborer subsists principally upon oatmeal and peas, whilst the English laborer uses a diet which is to a far less extent made up of these articles. Were the English and Scotch laborers supplied with pre-

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cisely the same kind and quality of food, we think there would be little, if any, difference in the amount and quality of their work. The highly nutritious nature of the pea and oat, as compared with the potato, will be evident from the analyses made of them.

These analyses prove that one pound of peas is capable of putting more muscle on the human machine than fifteen pounds of potatoes could do; and that, taking the amount of flesh-formers in a substance as a measure of its nutritive value, oats are more valuable than potatoes as food—that is, a pound of oatmeal will form as much lean flesh as half a stone of potatoes! The value of a food substance is not, however, altogether in proportion to its amount of nitrogenous or flesh-forming matters, but also, to a great degree, upon the proportion of starch it yields. In this respect the potato is by no means an inferior aliment; indeed, were it as deficient in heat-giving and fat-forming matters as it is in flesh-forming substances, it would be utterly impossible for working men to subsist, as they do, almost exclusively upon this so-called "national esculent."

From what has been stated, it is clear that potatoes contain a quantity of starch altogether disproportionate to their amount of nitrogenous or flesh-forming substances; and we have no hesitation in asserting that, as a general rule, a man fed exclusively on potatoes cannot be as hard-working and intelligent a laborer as if he were supplied with food of a more concentrated kind—one in which the muscle-forming constituents bore a higher proportion to the fat-forming elements. The addition of buttermilk (which is very rich in nitrogenous matters) to potatoes, serves in some measure to remedy the evils of a potato diet; but it requires a capacious middle region to accommodate the large quantity of potatoes and buttermilk which a hard-working man would require, to enable him to develop an amount of motive power equal to that expended, say, by a navvy in his day's toil. A mixed diet of potatoes and oatmeal is incomparably better than a pure potato diet, and if the oatmeal be the staple, and the potato the adjunctive article of food, so much the better.

Labor and Contentment.

The appended letter contains some most sensible remarks and not a little sound philosophy. We commend it to the attention of those discontented individuals who are forever seeking to disturb the harmony which should exist between the workman and his employer. We find the letter in a Boston paper:—

"I am a mechanic—I work the raw to the fabric, from coarse to fine. My wages are two dollars per day by the Sick days and legal holidays are the only ones I lose. I live well and manage to have something to show at the end of the year—say one hundred and fifty dollars. It is insignificant compared with the large sums your columns make mention of as the yearly gain of the trading classes. I am aware of it, and, what is fortunate, it fails to disturb me in the least, for I remember that healthy thrift is like a tree—at first only the twig, then the trunk, followed by branches, and not too hurriedly neither, lest the toughened process be overleaped; the firm, solid, capacious tree is matured. The lesson is, that real growth comes from below and works up. Gold in the beginning and fine gold later in the day. Industry and day wages have laws—I know it. To my next year's earnings I unite my last year's savings—and with the same expenditure of effort my gains enlarge.

"So saith the law of thrift. I don't live meanly, I assure you. Good food is my victuals, and liquor *isn't* my drink. The tobacco market I never seek. I go to church all day Sundays and am none the worse for it; and pay my pew-rent, I have time, there, among other privileges, to see who goes, and think of those who stay away, and calculate a little about them, too. Conclusion—that those who attend pay the smallest pew tax and get the least harm into the bargain. Another item is worth knowing in these fast days, namely, not to indulge in likings for all the 'dazzles' which art and cunning invent and fling temptingly before every dollar that is earned. To go without this, and go without that, may cross a little, but it has in it virtue, force, to sweeten later periods; it isn't neither a self-acting one, it comes like its sister virtues, by acquirement only—it is an accomplishment. Thus reasoning, I am content to work well at day wages—not disturbed to repeat that A or B makes yearly fifty or a hundred thousand dollars, for besides the luxury of toil, there is luxury of thought, that growth comes from labor, while waste wears away at the top. Primarily, day wages and growth; secondarily, ease and *decay*."

MISCELLANEOUS SUMMARY.

Process for Bleaching Gutta-Percha.—The *Journal de Pharmacie* gives the following process for bleaching gutta-percha:—"Dissolve the gutta-percha in twenty times its weight of boiling benzole, add to the solution plaster of very good quality, and agitate the mixture from time to time. By reposing for two days the plaster is deposited, and carries down with it all the impurities of the gutta-percha, insoluble in benzole. The clear liquid, decanted, is introduced by small portions at a time into twice its volume of alcohol, 90 per cent., agitating continually. During this operation the gutta-percha is precipitated in the state of a pasty mass, perfectly white. The desiccation of the gutta-percha, thus purified, requires several weeks' exposure to the air, but may be accelerated by trituration in a mortar, which liberates moisture which it tends to retain."

The making of combs in this country, commenced in West Newbury, during the Revolutionary war. At first an attempt was made to make horn buttons; and to aid in that a deserter from the British army, who had worked on combs at home, was brought up from Rowley, where he was living, and his knowledge and persuasion induced the making of combs. There was then no machinery for that purpose. The horns were steamed, and then straightened by being put between two smooth pieces of wood which were wedged together, and the combs were sawed by hand. Of course the process was slow and the work was rough. Since then the manufacture has been improved step by step, till in the course of eighty years it has been brought as near to perfection as almost any manufacture in this or any other country.

A Word about Chairs.—An eminent physician, speaking of our chairs, remarks that they are too high and too nearly horizontal. We slide forward, and our spines ache. The seats should be fifteen or sixteen inches high in front for men, and from eight to fourteen inches for children and women. The back part of the seat should be from one to three inches lower than the front part. This last is very important. The depth of the seat from front to back should be the same as the hight. The chair-back is likewise unphilosophical. The part which meets the small of the back should project furthest forward. Instead of this, at that point there is generally a hollow; this is the cause of much pain and weakness in the small of the back. The present seats produce discomfort, round shoulders and other distortions.

A Family poisoned by eating Uncooked Ham.—A family named Flaig, residing at No. 45 Elizabeth street, in this city, has recently been poisoned by eating uncooked ham. One of the children having died, Coroner Nauman held an inquest, when the testimony of Mrs. Werkmerster, grandmother of the child, and of several physicians was taken. Three doctors who had examined the ham, testified that it was alive with microscopic insects of the species known as *trichina spiralis*. This insect is a borer, and when introduced into the human stomach pierces the coat of that organ in order to make its way into the muscle of the body, where it makes itself a nest and lives. Several instances of death from this cause are already recorded in the medical books. It is always unsafe to eat ham uncooked, for the *trichina* haunts that kind of flesh.

The Cotton Manufacture.—The Newburyport *Herald*, in noticing the intention of the cotton manufacturers of Massachusetts to start their mills, opposes the movement on the ground that there is not raw material enough to keep them all profitably employed. It says that if the war continues, cotton cannot be reduced to forty cents per pound for years, and that in that event cloth will be cheaper than calico. The *Herald* thinks that under present circumstances a woollen mill can earn its value before the cotton mills can move.

Oil-cups that feed by wicks must not have the tubes filled too tight or they will not work.

Since publishing an article on "Submarine Warfare" we have received a great many communications in relation to the subject, which shows that this mode of warfare excites a great deal of attention at present. We shall try to find room for some of the communications spoken of, but it is impossible for us to publish all of them.

Emery.—Commercially 2,500 tuns of emery at this time supply the market of the world; 800 tuns of these come to the United States. Of these 800, 400 tuns come in a pulverized state from England. The remaining 400 tuns come in the bulk or rock state, and are manufactured in Ashland, Mass.

Light from petroleum costs about one-third as much as the same quantity from gas, at New York prices; and the petroleum light is better for the eyes, and of superior quality in every respect.

The Swiftest Ship.

The Sultan of Turkey possesses the swiftest vessel afloat. It is a steam yacht, named the *Taliah*, and was built by Messrs. Samuda, of Blackwall, England. Her burden is over 1,100 tons. Space is sacrificed to machinery, the whole object of the vessel being speed. She ran forty-five miles in two hours and five minutes, with the tide part of the way against her. Her speed is that of an average railway train.—*Exchange*.

[This is not extraordinary speed. There are plenty of merchant steamers in this country that can run faster, and their space is not sacrificed to the machinery either. The *City of Buffalo*, a passenger steamer, 350 feet long, and 40 odd feet beam, has run from Long Point light to the Buffalo dock in 3 hours, distance 75 miles. The *Mary Powell* has made 25 miles an hour consecutively on the North River; so has the *Daniel Drew*, and, under favorable circumstances, has slightly exceeded this. It is not asserted that these rates of speed are the average ones, neither do we suppose the Turkish yacht maintains a velocity of 22·50 miles per hour. Recently the gunboat, *Eutaw*, ran a distance of forty-five miles and back on the Potomac in five and one-half hours, with the tide in her favor going down. She averaged eighteen miles per hour.—Eds.

Canadian Reciprocity Treaty.

The communication of the Secretary of the U. S. Treasury, recently transmitted to the House of Representatives, in answer to a resolution of that body, contains statements of the practical operation of the Reciprocity Treaty, from which it appears that the domestic products and manufactures exported to Canada under that treaty, for the fiscal year ending June, 1863, amounted to about $18,500,000. The imports from Canada for the same period were $12,807,000. The exports of breadstuffs increased from $216,000 in 1849 to $9,588,000. Our exports of manufactures have been reduced from $4,186,000 in 1859 to $1,511,000 in 1863. The exports from Buffalo and eastward ports were, in 1863, $9,088,000. The tunnage of transportation by the Welland Canal was 15,000 to Canadian ports and 72,000 to United States ports, and by the St. Lawrence Canal 23,000 tuns to United States ports. The Secretary gives numerous tabular statements with reference to the Canadian trade, but makes no recommendation on the subject. There is one point on which Canadian reciprocity is all on one side, like the handle of a jug; we refer to their patent system.

Free Lectures on Chemistry.

Are all of our city readers aware that able lectures on chemistry, illustrated by numerous experiments, with ample apparatus and specimens, are delivered three times a week at the Cooper Institute? And that these lectures are perfectly free to all who choose to attend? Prof. Stone is one of the best lecturers on chemistry in the country. His enunciation is remarkably distinct, and he presents his facts in a way that none can fail to understand. Of course he has the universal fault of American teachers, of being in too much hurry to get over the ground, but he has this fault in less degree than most others. Did he proceed more slowly he would not only teach ten times as much to each of his hearers, but he would have ten times as many to hear him. The lectures are on Tuesday, Thursday and Saturday evenings, and begin at half past seven precisely, after which time no one is admitted.

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Improved Lantern.

The annexed engraving represents a convenient arrangement of a lamp with a lantern, in such a manner that, while it is separate from the shade or glass, it can readily be cleaned, trimmed and filled. Every person using the old style of lantern, wherein the lamp is merely secured to the shade by springs, notches or slots, must have experienced the inconvenience of such an arrangement. We have ourselves, and presume that our troubles in this respect are, in a measure, shared by the rest of mankind; sometimes the lamp becomes detached altogether, and if the carrier happens to be about an engine, the lamp is precipitated below into unseen depths, and is heard of no more; if in a barn, or any place filled with combustible materials, the sudden detachment of the lamp, which is liable to take place at any time with the fixtures we alluded to, is a source of great danger.

STRASZER'S IMPROVED LANTERN.

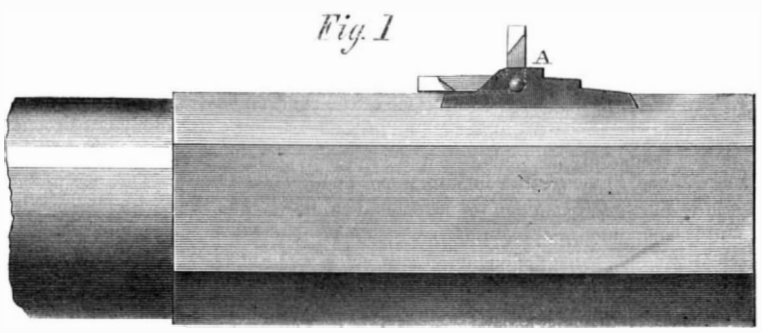
Our engraving represents the shade in the act of being removed from the lamp, and so clearly explains the object of the invention and manner of operation that a detailed account is superflous; the small wire staples at the bottom, which the operator presses together with his fingers, are connected to springs which, when the pressure is relaxed and the shade replaced, hold both lamp and shade beyond the possibility of detachment. The lamp is also permanently fastened to the shade by a hinge at the back. In other respects the lantern is not peculiar.

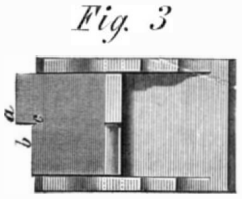
By the arrangement above described, accidental or designed, misplacement of the lamp is impossible. This lantern is a very good one, and was patented on January 27, 1863, through the Scientific American Patent Agency, by J. Straszer, of St. Louis, Mo. For further information address the inventor.

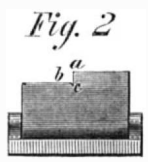
Improved Gun-sight.

The importance of obtaining a quick and certain aim, either on the battle-field or in the more pleasurable occupation of the hunter, cannot be overestimated; for, in the first instance, the efficiency of any given body of troops is greatly enhanced thereby, and in the latter not only success but oftentimes life itself depends upon a sure hand and steady aim.

The improved sight herewith illustrated is an excellent one in many respects and not only affords a means of bringing the barrel to bear on any desired point, but it also enables the person to judge of the distance of the enemy or the target; the comparative hight of the sight from *a* to *b*, and the known hight of the distant object, such as a horseman, deer, &c., afford some ground for estimating the elevation required to send the bullet truly to the mark. There is also another advantage in this sight, which consists in the ease with which the object aimed at can be covered, as the edge or vertical line, *c*, in connection with the horizontal edge, *b*, as also the notch in the corner, renders a line shot almost positively certain, and it is difficult to see how an ordinary marksman could fail to make a good shot with the aid of this sight. The main part of this sight consists in fixing an angle piece, A, of the usual construction to the rear of the barrel, as shown in Fig. 1; the other peculiarities have been noticed previously. The angle-pieces or leaves may be two or three in number, so as to provide for different ranges. Figs. 2 and 3 represent an end and plan views of the sight.







M'KIBBIN'S IMPROVED GUN-SIGHT.

The inventor says relative to his invention:—"So soon as the gun is brought to the shoulder all that is necessary is to look for the front sight and bring it into line with the notch in the corner, which can be done instaneously. A greater portion of the object aimed at is brought into view with this sight than with the ordinary sight."

This invention was patented on Sept. 15, 1863, through the Scientific American Patent Agency, by William McKibbin, of Buck Valley, Pa.; for further information address the inventor at that place.

Can We know of what the Stars are Composed?

The nearest fixed stars are so remote that light, moving at the rate of 192,000 miles in a second, occupies three years in coming from them to us, and yet it seems probable that we are to learn what some of the substances are which enter into the composition of these distant and unapproachable bodies. At the last meeting of the Royal Society, of Great Britain, the President made the following remarks in relation to this inquiry:—

"The researches of Kirchhoff and Bunsen have rendered it in a high degree probable that we shall be able to obtain much insight into the chemical nature of the atmospheres of the brighter fixed stars by observing the dark lines in their spectra, and comparing them with the bright lines in the spectra of elementary and perhaps also of compound bodies, in the state of incandescent gas or vapor. The interest of such an inquiry is obvious; but the difficulties involved in it are very great. The quantity of light coming from even such a star as Sirius is so small that, without the use of a powerful telescope, the spectrum obtained would be too faint to bear sufficient enlargement to show properly the fixed lines. The apparent diurnal motion of the stars causes much embarassment, unless the instrument be mounted equatorially, and furnished with a clock movement. The control of the experiments on incandescent bodies requires thorough knowledge of chemistry, so as to avoid being misled by impurities in the substances examined, and to be prepared to interpret decompositions or combinations which may take place under unusual circumstances, and which may be manifested only by their effects. Nor can the astronomical and physical parts of the inquiry be well dissociated, so as to be separately undertaken by different individuals; for the most elaborate drawings can hardly convey a faithful idea of the various aspects of the different dark and bright lines, which yet must be borne in mind in instituting a comparison in cases of apparent coincidence. It is fortunate, therefore, that the inquiry has been taken up by two gentlemen working in concert. In a short paper read to the Society on the 26th of last February, and published in the *Proceedings*, Mr. Huggins and Dr. Miller have described and figured the spectra of three of the brighter stars, and this part of the inquiry will doubtless be continued. In a paper since presented to the Society, Mr. Huggins describes the means employed for practically determining with accuracy the positions of any stellar lines which may be observed, with reference to known points of the spectrum, and has given beautiful maps of the spectra of twenty-four of the elementary bodies under the action of the inductive discharge, reserving others for a future communication. When the inquiry is completed, it is possible that we may obtain an amount of knowledge respecting the constitution of those distant heavenly bodies of which we have at present little conception."

Engineering and Architecture.

It has been remarked that while engineers are always striving to produce new forms, architects are always seeking to reproduce the old ones The engineer feels that he lives in an age of progress. He builds the future on the entire past, and hopes and expects to go beyond. He may fail twenty times, but at the twenty-first he will effect a degree of progress that will form the basis of all future engineering. Compare the ancient ships, the largest of which might hold two or three hundred persons, with the *Great Eastern*, capable of carrying ten thousand easily across the Atlantic. This has been our progress in naval engineering. In bridges, the present age has produced the Menai Bridge in England, the tubular bridge across the St. Lawrence, and the hardly less wonderful suspension railway bridge thrown across the Niagara river, just below the Falls, by Mr. Roebling. This last has cost but five hundred dollars per foot, where the tubulars all cost vastly more, and there is little doubt but if the Menai bridge had not been erected before this, it never now would have been built at all, since Mr. Roebling's success.

In tunnels and canals the progress made is wonderful. It is but about a hundred years since Brindley proposed to cut the Hardcastle tunnel, 2880 yard

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long, and was laughed at. Now the great tunnel under Mount Cenis, more than thirteen thousand yards long, will probably be cut through in about the same time and nearly a mile below the surface, the whole mountain being seemingly a mass of solid rock. There is little doubt but that canals will, for most purposes, be considered such "slow coaches" that they will with difficulty hold their own against railroads, and yet the French are now constructing one canal in Egypt that will throw all other modern works of the kind into the shade, and unite the waters of the Mediterranean with those of the Red Sea. Railroads now unite the capitals of all Europe; they are rapidly being pushed to all the chief cities even of Asia, while in America even our smaller towns find themselves unable to keep up with the times without a railroad with its convenient station. This is not rapid enough, however, for modern ideas of the travel of information, and we are engineering telegraph lines over mountains and under the ocean, until it seems no improbable conjecture that, in two or three years, we may, in all the principal cities of the Atlantic, have in the daily papers the news from London, Canton and Sydney New South Wales of the day before.

The secret of all this rapid progress is that men have faith in it, and expect it. They do not consider themselves tied up by precedent, and obliged to do nothing which has not been attempted before. But, on the contrary, they feel assured that they are but at the threshold of their art. Architects, on the other hand, are afraid to deviate from the ancient models of form, and therefore it is that they make so little progress. In one sense it is true that lines of beauty and harmonious figures and proportions have been so long discussed that little can be added to our stock of knowledge on these points. But, on the other hand, every original design in engineering requires an appropriate architectural expression and embodiment in a significant and graceful outward form; and the cultivation of the æsthetics of architecture, so as to throw around the works of all modern engineering and progress a proper and expressive form, will really allow of that unlimited progress by which architecture shall be built upon the whole wisdom and history of the past, and grow naturally out of it without being fettered by it.

It is not architecture and engineering alone to which these remarks apply. Progress is to be the fundamental faith of man in everything—a progress that carefully embodies all the wisdom of the past, but is not fettered by it so as to obstruct the faith in real progress. In social science, in politics, in religion, it is equally true that the past is to be the basis of an ever-progressing future, in the faith of which we must live and act.—*Philadelphia Ledger.*

The Money Phases of Coin and Paper.

It is a rather curious fact that the only coin now in current use on this continent, which is not round, is the fifty-dollar gold piece struck for California, which is octagonal in shape. All the coins in Europe are round. In Japan they have oblong wedges of silver. It is curious, too, that for many years money has been made out of paper, when leather or cloth would seem to be much more durable. Yet paper, when representing coin, lasts a great while, and not unfrequently the Bank of England receives a note of extraordinary age; and the Bank of Bengal, in India, recently was called upon to pay several thousand pounds of notes so old that none of the present generation remembered the pattern.

It is also worthy of remark, that gems or precious stones have never been used for money, nor has platinum or any other metal taken the place of gold. In Africa, a species of shell forms the circulating medium, the value of which fluctuates sometimes twenty per cent a week. But all civilized countries have gold as the standard of money value, and all other circulating media are but representatives of the great standard. Only the Hindoo has ever learned to test coin accurately by the hand.

Of all gold coinage, that of England is perhaps the most beautiful. A new, fresh gold sovereign is probably as graceful and attractive a coin as exists. Next to it, the American eagle is the most elegant gold coin. The twenty-franc pieces of the present kingdom of Italy are also very neat.

Probably the smallest gold coin in use is the French five-franc piece, although a few half-dollar gold pieces have been struck off in California. At present there are current in France, in every day traffic, coins bearing the noble face of the first Napoleon, both as Consul and Emperor; the heavy round heads of Charles X. and Louis XVIII.; the shrewd countenance of Louis Philippe, and the familiar features of the present Emperor. In some cases Napoleon III. is represented with, and in others without, a laurel wreath.

The most beautiful silver coinage is that of Russia, each piece being in itself a work of art, so finely and elaborately is the die cut out. On the other hand, the ugliest silver coinage is that of the free city of Hamburg; each piece, adulterated and poorly cut, is usually to be found encrusted with dirt and filth, and looking like a refuse fragment of tin. The silver coinage of Germany is very bad also. In Italy—excepting the portions subject to the Pope and the Emperor of Austria—the franc piece is taking the place of former coins, though the local coinage of the former duchies of Parma and Modena still infests those portions of the country. Naples also retains in retail traffic the complicated coins in use under the Bourbon rule.

Perhaps the neatest paper money in the world is that of Greece, which is manufactured by American engravers and workmen. The old bank currency of this country is very often elegant. The worst and most wretched paper money in the world is the five kreutzer note of Austria, printed on a soft, thick, grayish paper, which has a faculty of washing and rubbing away like ordinary blotting paper. But nearly as bad is the postal currency with which, for our sins, we are now afflicted. He who steals a purse full of our five and ten cent notes—frayed, dirty, worn and illegible—does, indeed, steal "trash."

Conflagration at Colt's Armory.

At about 8¼ o'clock on Thursday morning, Feb. 4, the deep tones of the steam-gong at Colt's armory sounded through the city, and so protracted was its noise that the community generally anticipated the ringing of bells and cries of fire which soon followed. The members of the Fire Department promptly rushed to the scene, and were speedily followed by large crowds of men, women, and children.

The regular work was commenced on Thursday, in the various departments of the establisment, at seven o'clock. An hour and a quarter later some of the workmen discovered smoke issuing from the attic of the wing to the main building directly over the polishing room. Investigation showed that the fire was somewhere near the main driving pulley, and efforts were at once made to stop its further progress. A number of men proceeded to the attic, fortified with a length of hose, and attempted to let on the water, but none came, and very soon the flames burst out forcing the men to retire. The fire communicated with the roof, and in less than half an hour the upper works of the entire structure, now burnt, were in flames. The top floor of the building was supported by the roof by braces, and when they were burned, of course, the floor fell through.

Eighteen hundred workmen, aroused by the sudden cry of fire in their midst, could not well maintain perfect composure; and thus it was that, in some instances, the wildest excitement ensued. The men were all locked in their respective departments, it being a rule of the company; and this fact added to the confusion. So soon, however, as the doors were thrown open, and the men saw where and what the danger was, they showed, as a general thing, great coolness, and, in many instances, manifested excessive courage in rushing through the flames and saving such property as they could conveniently remove.

The building destroyed is the original structure erected by Colonel Colt in 1854. It was built of Portland stone, facing the river, the main building being five hundred feet long, sixty feet wide, and three stories high, with a wing extending east from the center, two hundred and fifty feet, of the same width and height, the whole having a slate roof.

After the speedy communication of the flames with the entire upper works of the building, there seemed to be little hope that the fire could be stayed until it had accomplished the work of total destruction. The floors of the building were of yellow pine, and had become thoroughly saturated with oil which had dripped from the machinery. In the attic, where the fire originated, there was stored a large number of patterns, which furnished ready combustion. The flames shot through the openings with terrible fury; timbers fell here and there like baubles before the pranks of a child; the black smoke curled in the air and shot out in full volumes; and the powerful streams of water were but drops to sparkle in the red flame for a moment and sink down, hissing and defied. At about 9 o'clock, the dome over the main building fell in with a tremendous crash, and gave to the flames new life for the moment. Working north, the fire communicated with the covered bridge-way running from the main building to the office of the company, about thirty feet distant, and that was rapidly enveloped in flames. This bridge had no support whatever from the ground, but was fastened together with iron cross-braces, and made so strong otherwise that the rapidity with which the fire did its destructive work gave no time for cutting it away. Could it have been removed, the office would probably have been saved. The office was a large and handsome brick building, and the first story now remains with the walls; the firemen having mastered the flames there for the first time. The upper portion of it, however, is a complete wreck.

The building was used solely for the manufacture of pistols and revolving rifles, and about nine hundred men were employed in it. The principal contractors were:—Wesley Smith, William H. Green, Charles Parker, V. Cooper, Dwight Mitchell, Giles Remington, J. R. Wittig, Robertson & Best, Evans & Deming, Joseph Williams, Joseph Davis, Charles Thurston, Chauncey Johnson, Robert Kenyon, Norman Smith, Peter Dusch, Augustus Fiege, and Messrs. Bunnell, Whitehouse, Hopkins, Cady, Ives, Parker, Whitney, and Bordenstein. Most of these lost all their tools, and succeeded in saving but very little of the work they had in hand.

The adjoining building—the two forming in their ground plan the shape of the letter H—was devoted exclusively to the manufacture of the United States rifle muskets, and it is here, fortunately, that most of the Government contracts with the company are being filled. From seven to eight hundred men are employed in it, and their work will, after a short delay, be resumed. The building is damaged but slightly; but some of the machinery is considerably injured by water, and portions of it were torn up for removal, anticipating that the entire works would be burnt, so that it will take some little time to repair and get things in proper shape for the renewal of operations.

Speculations were rife all day as to the cause of the fire. Various opinions were expressed, and no person about the premises could give any satisfactory solution of the question. The fire having been first discovered near the main driving pulley, it was at first suggested that friction had occasioned it; but the gearing ran in very heavy iron boxes, so that supposition soon fell to the ground. Near this pulley was a small drying-room heated by steam pipes, which was filled with pistol stocks, furnishing very combustible material in case fire should be brought in contact with it. Cotton waste might possibly have been left near this room, or in it, by accident, for one of the workmen made it his duty to go there every morning to oil the pulley, &c., and did so on the morning of the fire, and from this the fire might have started. A contractor at the factory, who was among the first to go into the attic, informed us that when he reached there the fire was confined to the drying-room, and had water come through the hose which he and his companions had, they would have probably stopped the further progress of the fire. No water coming, they waited for a moment or two, when the flames burst out from the drying-room and immediately ignited with the belt on the pulley and shot with lightning rapidity to the roof. The men were then forced to retire. When once started, it is said the fire swept across the building faster than a man could run, everything being so dry—just like tinder. Many believed that it was the work of an incendiary, and among them were some of the most prominent contractors in the concern.

The entire building is a complete mass of broken, charred remains, only a portion of the walls are up. The engines and the boilers are destroyed beyond repair. There are two of the former—one beam engine of three hundred horse-power, and a double horizontal engine of four hundred horse-power. A small engine which was the first one used by Col. Colt in the beginning of his business—when he worked on a small scale and struggled to get along—was employed

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as occasion required in the main building. It was thought much of by the colonel. This is also among the *debris*. Several small buildings, including the blacksmith's shop, between the main buildings, were slightly injured by the falling walls, but are not materially damaged.

Painful were the many rumors which gained currency through the day, and at one time it was feared that many lives were lost; but the persons named as missing, one by one, made their appearance and relieved the general anxiety. One of the workmen, however, E. K. Fox, a man aged about fifty years, was without doubt, burnt up. He had been in and out of the building several times, aiding in removing property, and the last time he went in he was accompanied by Mr. Joseph Williams, for whom he worked. The latter seeing the flames were making very rapid headway, started to leave, and called to him to follow, as the roof was liable to fall in any moment. Mr. Williams went out of the building, supposing his advice was taken. A man by the name of Barney Rooney went up afterward, and says Fox was then there. At this time a portion of the roof fell, knocking Rooney down, but he managed to crawl out and was saved. He called to Fox to hurry, and that was the last seen of the missing man. He has a wife and family living, within a short distance of the factory, and they have heard nothing of him; so it is not doubted that, when the roof fell, he was buried beneath and burned to death.

The loss of property is immense. The value of work constructed, and in process of construction, was one million of dollars! In addition the building, &c. foot up the aggregate, direct loss, at not far from two millions, though it may not exceed fifteen hundred thousand dollars. The loss indirectly, figuring the stoppage of the works, the throwing of so many men out of employment, &c., cannot be computed. Said one of the chief managers of the concern:—"If any one had come to us yesterday, and offered us *four millions* for what is destroyed, we shouldn't have looked at it." Very much of the machinery was manufactured on the spot, the patterns of which were destroyed, and a long time would be required to replace that which is lost. Three years, at least, of faithful labor, would hardly place the works in the order they were.

The total insurance is $660,000. This is on buildings, machinery, &c., covering the entire establishment—that is, including that which is not destroyed. It is calculated that the loss will call for about 60 per cent of the amount of the policies, or $396,000; leaving a heavy loss for the company to bear.

The firemen met with many difficulties in commencing their operations. The reservoirs were found inadequate, and it was rendered necessary to take three of the four steamers to the river to obtain water. At so great a distance, they were obliged to use seven hundred and fifty feet of hose each, and to have but one stream each on the fire. The hose burst repeatedly.

Several men were caught in the upper stories of the building, and could not get out except through the windows. Ladders were brought, and it was found the longest would not reach; but some men near by placed it on their shoulders, and lifted it so that inmates of the building made their escape upon it. One of the workmen became so much frightened that he hung himself out of a second story window by his hands, and, without waiting for a ladder, dropped finally to the ground, and landed, fortunately, in safety.

Josiah Howe, a contractor, who lives on Grove street, had one of his wrists broken. As soon as it was known that the armory was on fire the work at Sharps' factory was suspended, and no business was done during the day. A steamer was sent down to the ruins last evening, and remained there all night to put a stop to any fresh break-out which might occur. About one thousand lathes and milling machines were destroyed. The safe was found in good order; none of the contents harmed. Col. Colt never had this property insured, preferring to take his own risk; and it was not till after his death that policies were taken out. Thousands visited the spot during the day. The streets and avenues leading thereto were crowded with pedestrians. Large numbers were from the surrounding towns, and probably not less than 20,000 people viewed the ruins. If the office-building had been saved, the value of $400,000 would have been saved to the company. In it were valuable drawings, which it will be almost impossible to replace. The chief delay in the resumption of business in the building saved will arise from the fact that in the old building all the screws for the work were made, and all the polishing done. New machines will have to be made.—*Hartford Courant.*

The owners of the capital of the Colt Patent Arms Company have decided to rebuild the factory as soon as possible. They have a million dollars of the capital still unimpaired, and will go at the work at once. Mrs. Colt, who owns a large share of the stock, expresses her determination to have the factory rebuilt just as her husband left it. In this view she is sustained by Mr. Samuel Colt, Jr., and indeed by all the holders of the stock. The company will immediately occupy the tobacco warehouse, and put in machinery for the manufacture of pistols.—*N. Y. Tribune.*

Correspondence

Gold-mining in California.

Messrs. Editors:—The progress of gold-mining in California has witnessed a series of ingenious improvements in the mining art. At first the miners worked singly and independently; now they are united in companies and mostly work in squads. The early miners' implement was a large tin or wooden "pan" which was filled with auriferous earth and water, then shaken to throw off the sand and leave the gold at the bottom. With such a dish a miner could once wash about 1,000 lbs. of earth per day, and could average twenty dollars per day of returns.

After the pan came the "rocker," which consists of an oblong box open at one end. The bottom is covered with a piece of coarse cloth, and the box is inclined, and set so as to be rocked back and forth, like a cradle. A grating is secured at the top on the upper end, and the earth containing the gold dust is shovelled upon it, and a stream of water made to flow upon it during the operation of rocking. The gravel remains in the grating, and the sand and gold pass through; but while the sand flows out with the water at the lower end of the box, the gold is kept back by the coarse cloth on the bottom. With a rocker, a miner can wash four times more earth per day than with a pan.

The "long Tom" succeeded the rocker, and by using a rapid current of water simply flowing over a very long inclined box containing the sand, one man could wash five times more earth than with the rocker. But the progress of mining made a vast stride when the system of "sluicing" was invented. This improvement has revolutionized the modes of obtaining gold in the "dry diggings." The "sluice" is a narrow canal formed of planks, and some of these canals in California are over 3,000 feet in length. The bottom is inclined and formed of rough wood, and traversed by a stream of water flowing through it. Several diggers shovel the earth ceaselessly into its upper end; the water carries away the stones and sand; but the gold being so much heavier falls to the bottom, separated from the muddy water, and it combines with mercury placed on the bottom, by which its particles are seized and amalgamated. The gold amalgam is taken out of the sluice about once every week, submitted to heat in a retort and the mercury evaporated to be used over again. With the sluicing system, soils containing about one-fortieth of the gold in the first "wet diggings" are worked with much profit. The invention of the sluicing system led to the working of "dry diggings," situated far from the rivers. The water for sluicing purposes is conveyed long distances in tunnels formed of logs and planks. The "dry diggings" consist of heaps or hills of sand and gravel—diluvian deposits. In these the gold is very irregularly distributed; some contain large quantities, while others are almost barren of the metal. These diggings are of vast extent, and cannot be worked up for many years to come. They are, however, situated on the lower grounds, and are not so healthy for the miners, as the water fills up the excavations, and in many cases becomes stagnant, and engenders fevers, &c. M. C.

A Question in Hydrostatics.

Messrs. Editors:—Seeing that you continue to answer questions of correspondents, I have concluded to solicit your opinion on a subject which may not be of much importance, but which has puzzled me for some time. I will state it as briefly as possible:—Suppose I have a boiler in an elevated position and supply it with just enough water to fill it with steam; but instead of taking the steam from the top, as is generally done, I attach the pipe to the bottom, having a valve to prevent the escape of the water while it is being heated. Now if we have a cylinder at the bottom of the pipe—say 30 feet below—when the steam is turned into the cylinder, have I not the full hydrostatic pressure of a column of water of that hight, provided the water in the boiler is sufficient or more than enough to fill the pipe, before it is converted into steam? J. R. M.

Cincinnati, Ohio, Feb. 4, 1864.

[By converting water into steam its weight is not diminished. The steam is precisely as heavy as the water from which it is formed. In the case supposed by our correspondent, however, the proportion of steam in the pipe would be much smaller than the proportion of water, and the pressure from the weight would consequently be less.—Eds.

Speed of Cutting Tools.

Messrs. Editors:—On page 41, present volume of the Scientific American (Jan. 16th, 1863) there is an article on the speed of working different metals, and the rates of speed at which cutting tools will bear to be run. Brass is not mentioned for a certainty at all, it being so changeable in its nature, but it is set down at 25 feet. I think it is a metal that costs more to work it than iron or steel, by machinists generally. I have often learned many valuable things from your paper. In the hope that it may be of some use to the machinists who peruse your paper, I send you this form of tool for cutting brass, which I have found by experience to be one of the best used, I will state what I have done with one: I took the bushing for the U. S. S. *Pawtucket's* air-pump, it being 5 feet 8 inches in length, and 31⅝ inches finished outside. The casting having expanded in pouring was 32¾ inches on an average. With this kind of tool, I readily ran the length of the bushing at the rate of 73¾ feet a minute, at 30 to the inch, cutting a ¼ inch on a side without grinding or touching the tool to sharpen it. The bushing was ready for its place in 35 hours running time. If any of your readers can beat this, I would like to know it.

J. R. Abbe.

Providence, R. I., Jan. 22, 1864.

[There is no particular novelty in the tool sent us, it being merely a round-nosed tool ⅜ of an inch wide, with the cutting face sloped away to the point at an angle of 5° with the shank. We don't understand what "30 to the inch" means, but suppose it relates to the feed. Correspondents should be explicit in writing on such matters.—Eds.

The Decimal System.

Messrs. Editors:—The following reflection occurs on reading an account of the French metrical system. The time and money expended in propagating and maintaining our chaotic system are sufficient to give collegiate education to the whole population.

J. Edi.

Vernon, Wis. Jan. 26, 1864.

Letters from Inventors.

Messrs. Munn & Co.:—As you are the friend of inventors, and their grievances are generally made known to Congress through you, &c., I would say that there is one clause in the Patent Law that should by all means be amended, if the Government has any respect for inventors as a class; and I think it has, and will act if the facts are pressed upon Congress. The law that I have reference to is that which requires the inventor to pay into the Treasury $20, within six months after his patent has been allowed, or else said patent is made public property. Now, I don't object to the six months' clause, but I do object to the patent being made public property at the end of six months; for it is robbing the inventor of his rights. He should have at least two years after the six months expire to redeem his patent, by paying, say, $10, $15 or $20 extra; and the law should be so amended that those who have patents which the six months' law has deprived them of, should have a chance to redeem their invention by paying into the Treasury a reasonable amount. The necessities for this amendment are innumerable; there are many instances where the inventor is almost compelled to let his patent lay over for six months; some have made a mistake in the time they should have paid the $20; in other cases, the mail has failed to get the money through in time, or

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the express has failed to send the money, or perhaps the inventor is now a soldier lying dead upon the battle-field; before his friends can ascertain the facts concerning his application for a patent, the six months have expired, and the law has robbed him of his invention. Perhaps, again, the inventor is a prisoner at Richmond, Va., cut off from all communication with the U. S. Patent Office. The six months are sure to expire during his incarceration; but he cannot help it. So you see there are many reasons why the clause should be amended.

Now what I want you to do is to press upon Congress, by petition or otherwise, the necessity of this change, in order that all those who have lost their patents by various causes can have a chance to redeem them within two years, or some approximate period of time. I would like to know your opinion on this matter.

THOS. J. PRICE.

Industry, Ills., Jan. 30, 1864.

MESSRS. MUNN & Co.:—I am in receipt of your excellent journal, containing the illustration of my gun. I can hardly find terms adequate to express my appreciation of the merits of the SCIENTIFIC AMERICAN, or the gratitude I feel for the able and speedy manner in which you have obtained this patent for me. Your generosity was certainly very great and marked, in offering to make a second application when the first had failed, at an imminent risk of bringing the expense upon yourselves. I repeat my thanks, with the assurance that if I ever find occasion to have any more patent business performed, "Messrs. Munn & Co." shall do it for me. I sincerely wish that the reputation of your journal may ever remain at its present high estimation.

R. B. REYNOLDS.

Naval Academy, Newport, R. I.,
January 26, 1864.

MESSRS. MUNN & Co.:—You will accept my thanks for the very able and expeditious manner in which you have conducted my "claim." I will surely recommend you to every one wishing to have patent business ably attended to; and I can do so with the better assurance as I had an interview with a "brother inventor," who had just been informed of his claim being allowed; but his agent had been more months in obtaining it than you had been weeks in procuring my patent.

JESSE C. CHESNEY.

Abingdon, Ills., Feb. 2, 1864.

MESSRS. MUNN & Co.:—I have received my patent papers for Hide and Skin Handling Apparatus. The drawings are excellent, and the specification is got up in the very best manner, for which you will accept my thanks. This, I believe, is the first patent granted to a citizen of the new State of West Virginia.

JESSE S. WHEAT.

South Wheeling, W. Va., Feb. 1, 1864.

Champagne.

M. Moet's friends may dilate as they please upon the processes of the vintage—crushing, fermentation, bottling, disgorging, sweetening, coloring, brandying, stringing, wiring and papering; but monopoly built up those palaces and castles at Epernay, where the Messrs, Xatart and Gorgot sell £4,000 worth of champagne corks annually. And Madame Cliquot, who from her castle windows can espy the vineyards at Dormans, Haut Villiers, Chatillon, and Ai, might let us have some of her myriads of sweet draughts far more reasonably if the bottling embarrassments were once got over. She and M. Moet, it is well known, each keep a stock of about three millions of bottles on hand, stacked in vast frames, with thousands of gallons besides in tremendous iron-braced vats. There is no more interesting sight in Europe than those Titanic vaults, with the manufacture of champagne in continual progress; but the mystery is kept up by credulous travellers, who are gravely informed, and as gravely inform their readers, that "the number of manipulations or handlings which every pint and a half of champagne wine undergoes before it finds its way to our dinner-tables exceeds, at the lowest estimate, a hundred and fifty."

The manufacturers, however, complain that the English do not appreciate pure champagne. The Russians and all the northern nations consume it to an enormous extent, but unadulterated. We however, insist upon an admixture of from 5 to 12 gallons of brandy with every 40 gallons of the wine, as used to be the case with sherry. Of course, the juice of the champagne grape must be sweetened, as in its natural state it would be undrinkable, "Sauterne and wormwood." But as to price, the best—*grand vin crêmant*—is 4s. per bottle at Rheims, and the cheapest 2s. 5d., this latter being of no despicable quality. Take the second quality, however, or Verzenay, at 3s. 8d. Three dozen, bottled, packed, cased, and delivered at the railway station of that town, would cost £7 4s. In London it would be £10 4s., or sixty-eight shillings the dozen; but who ever gets it, or anything like it, at the price? And here we would hint to schools of art design, and to glass-blowers, that the princes of the vineyards of champagne almost invariably quaff the creaming draught out of glasses slightly tulip-shaped in the bowl and hollow in the stem, with a globular cavity beneath—an arrangement which keeps up the effervescence so long as a teaspoonful of wine remains. Thus drink the champagne epicures of Champagne itself. If it be true, as a high authority asserts, and as experience seems to testify, that "the art of making wine, at least good wine, is wholly French," the art of drinking it, at any rate, may surely be cultivated in England. Sir Richard Hawkins, the inveterate enemy of all Spanish vintages—"Spanish sacks," he calls them—relented in favor of champagne, which, he allowed, "caused neither hot burning fevers nor dropsy." Wherefore, being of opinion with Rabelais, that "never did a great man hate good wine," and deeming that the sparkling varieties, after having been "cooled a long age in the deep-delved earth," are among the best, we concur in the protest against that half-crown a gallon duty, or, still more to the purpose, against the notion that our merchants cannot become their own bottlers. We shall never, perhaps, return to the halcyon days when a pint and a half of the best Moselle was sold on the banks of the river for one halfpenny, and possibly we shall taste no more such Rhenish as that of which Nelson laid by a bottle to drink after each great victory, for the dealers say that prices will rise and quality deteriorate; but while upon the tempting topic, let us record that John Evelyn, who pressed his own grapes, declared that to cool wine with ice or snow wat a very perilous practice. So, at the least, the famous physician, Salvatico, told him. We rather believe, however, that adulteration does the principal mischief; though a French author attributes half the "consumption, jaundice, suicide, heresy, and sedition" we suffer from, to the habit of diluting French wine with English water—a custom dating, he says, from the battle of Agincourt, "before which consumption and suicide were unknown." Perhaps for "water," we should read "coloring matter," "acids" and "brandy." The alcohol in the wine-bottle, after all, is the principle against which the abstainers inveigh, although it might startle mothers of families to learn that raisin is stronger than hock, and currant than tokay; but champagne, the analysts agree, when pure, is totally harmless; though in its pure state, so far as England is concerned, it is even rarer than sherry, the popular sherry being Cape wine, bad Cognac, and tolerable cider, adroitly blended, to the astonishment of those who drink it "dry" from the cathedral-like vaults of Xeres.—*London Grocer.*

Preservation of Grapes and Other Fruits.

M. le Docteur Rauch communicates the following to the *Moniteur Scientifique:*—

"Various means, more or less successful, have been suggested for preserving grapes—a fruit most delicious and wholesome, but very difficult to keep. One of the simplest ways is to dip the ends—the stalks of the bunches—in sealing-wax, and to suspend them from poles or cords in a cellar or cool room, where they will not be exposed to frost. By carefully removing any berries that may decay, grapes in this way may be preserved till the end of December. They generally preserve their freshness longer in a cellar than in a room, where the air is drier; and this applies to nearly all other fruits. For this reason plums may be preserved for months in vessels filled with sand, hermetically sealed, and buried in the ground; exclusion of the air having the same effect in each case.

"In the south of Russia there is another way of preserving grapes. They are gathered before they are quite ripe, put into large pots, and so filled with millet that each fruit is separate, and the pots are covered so as to render them air-tight. They are sent in this way to the markets of St. Petersburg. After remaining thus for a whole year, they are still very sweet, all their sugar being developed by the ripening process in the pots.

"Recent experiments show that cotton possesses the useful property of preserving various substances. Meat-broth in a bottle, lightly closed with cotton, has been found to keep unaltered for more than a year. After this it was a natural course to try its preservative effect on various other substances, and in America cotton has long been successfully used for preserving grapes, in the following manner:—The branches are left on the vine-stock as long as possible, even to the early frosts, provided they are but slight. The bunches are then cut with a sharp knife, all the damaged fruit removed with scissors, and then left for several days in a cool room. They are then put between layers of ordinary cotton, handling them very carefully, and placed in vessels such as tin boxes, or glass preserve pots, taking care not to put too many layers, so as to crush the lowermost. The receptacles are then covered and sealed. The latter precaution is certainly of use, though American farmers generally disregard it, and nevertheless have good grapes often as late as April. The fruit is kept in a cool place, but out of the reach of frosts. Apples and pears are still more easily preserved in cotton, through it retards their ripening, which wool on the contrary, accelerates. American farmers, therefore, a few days before they wish to eat the fruit, wrap it in wool, when it ought to take a beautiful golden color; and pears ripened in this way are sold for almost double the price of those still a little unripe.

"The most recent method was invented by a Frenchman, M. Charmeux, whose grapes, exhibited at several exhibitions, excited considerable attention. His method I have tried, and found it succeed very well. He attaches great importance to the maintenance of a certain degree of humidity. His directions are as follows:—Leave the fruit on the vine as long as the season allows, cut off the bunches so as to leave a piece of the branch adhering to the stalk, comprising about two nodules above and three or four below. Carefully cement the upper end of the branch, and place the lower end in a phial filled with water, containing a little powdered charcoal, to prevent decomposition. Close the phial with wax, place the grapes in straw or cotton, in a cool room, but screened from frost. It might be better to hang them up, which could easily be done if the phials are well sealed. In this way, and by occasionally picking out any decayed grapes, I succeeded in preserving them from the autumn of 1859 to the beginning of April, 1860, and then I found the fruit excellent. They might, no doubt, be kept longer in a cellar, or in some place where the temperature is constantly at the same low degree, and darkness would probably be favorable to their preservation."

Important Patent Decision.

UNITED STATES CIRCUIT COURT.—BEFORE JUDGE SHIPMAN.

Jan. 14.—*Clark's Patent Steam and Fire Regulator Company against Wm. Noyes.*—This was a suit to restrain defendant from infringing re-issued Letters Patent granted to complainants for "a new and useful improvement for regulating the pressure of steam in steam-boilers." A preliminary injunction was heretofore granted in this case, and it now came up for a final hearing. The Court said:—"A decree must be entered in this case for the complainants. The objection that they have no existence as a corporation is not well founded. They became a corporation under the laws of New York, and have never been dissolved. Whether they have done or omitted to do anything by reason of which they might be liable to be dissolved, in proceedings taken against them for that purpose, it is immaterial here to inquire. I have no doubt the patent is a good and valid one. The invention is useful and meritorious. It has been sustained after a full and laborious trial at law, and with the verdict rendered on that trial I was and still am, after mature deliberation, satisfied. Let a decree be entered making the injunction perpetual."

Economical Steamer.

The *Eutaw*, on her trial trip on Saturday (Feb. 6th), ran twenty miles the hour, the tide favoring her part of the way. With wind and tide against her, on the return trip, she made seventeen and one-seventh miles the hour. One gun and some of her coal has been removed to give her better trim. Her engines made twenty-two and a half revolutions with forty-five pounds of steam. The consumption of coal was two and thirty-seven one-hundredths *tuns* per horse-power per hour.—*Exchange.*

[As the *Eutaw* developed over 1,000-horse power on this trip it was a rather costly excursion. Leaving the 37-100ths of a tun out, 2,000 tuns per hour is a little extravagant. The paragraph should read *pounds* for tuns; but such a stupid mistake often makes a great deal of mischief.

MINK skins, now worth from $4 to $7 each, were formerly heavy in the market at a "quarter" apiece.

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Improved Lifting Machine.

The introduction of a powerful machine for extracting stumps from cleared land, or for doing manifold duties wherein sheer force is an indispensable requisite, is a thing to be greatly desired by every one who engages actively in the business of life. Farmers, particularly, have occasion for the services of such a machine, not only for stump-pulling, but for lifting heavy stones, moving buildings, loading heavy articles, &c. &c. The machine herewith illustrated will be found useful for the duties above mentioned, and notwithstanding the powerful strain which it can exert, is in no wise complicated, difficult to work, or heavy to transport from place to place.

If the reader will refer to Fig. 1 he will see that, as adapted to stump pulling, the machine is fitted to a strong wooden frame, A, which has a pair of rollers on one side and square feet on the other, to prevent slipping. The mechanism through which power is transmitted consists of a stout shaft, B, running in boxes, and the ratchet wheel, C, fastened to said shaft. In the teeth of this wheel there rest two pawls, D and E, which are jointed to an iron socket, F; this socket works on a center, G, and has two wooden levers, H, fitted to it, by which the force of the workmen is applied to the main shaft. From the shaft a stout rope, or chain if preferred, runs to the top of the frame and over a roller there placed; at the end of the rope there is a hook which can be used as shown or in any other manner. These are the principal details. The operation is obvious; by moving the levers up and down, like a pump handle, the pawls engage successively with the ratchet wheel, and exert a tremendous strain on the work to be done; only one pawl is withdrawn from the wheel at once, so that no preventer-pawl is needed. As a pawl is situated on either side of the center of motion the revolution of the wheel is continuous, for as one pawl is withdrawn from the wheel, the other engages with it, and continues the strain as long as the levers are worked. Should it be necessary, both pawls can be withdrawn from the ratchet wheel by the hand-lever, I. The work in hand can be lowered to the ground at pleasure.

Fig. 1.

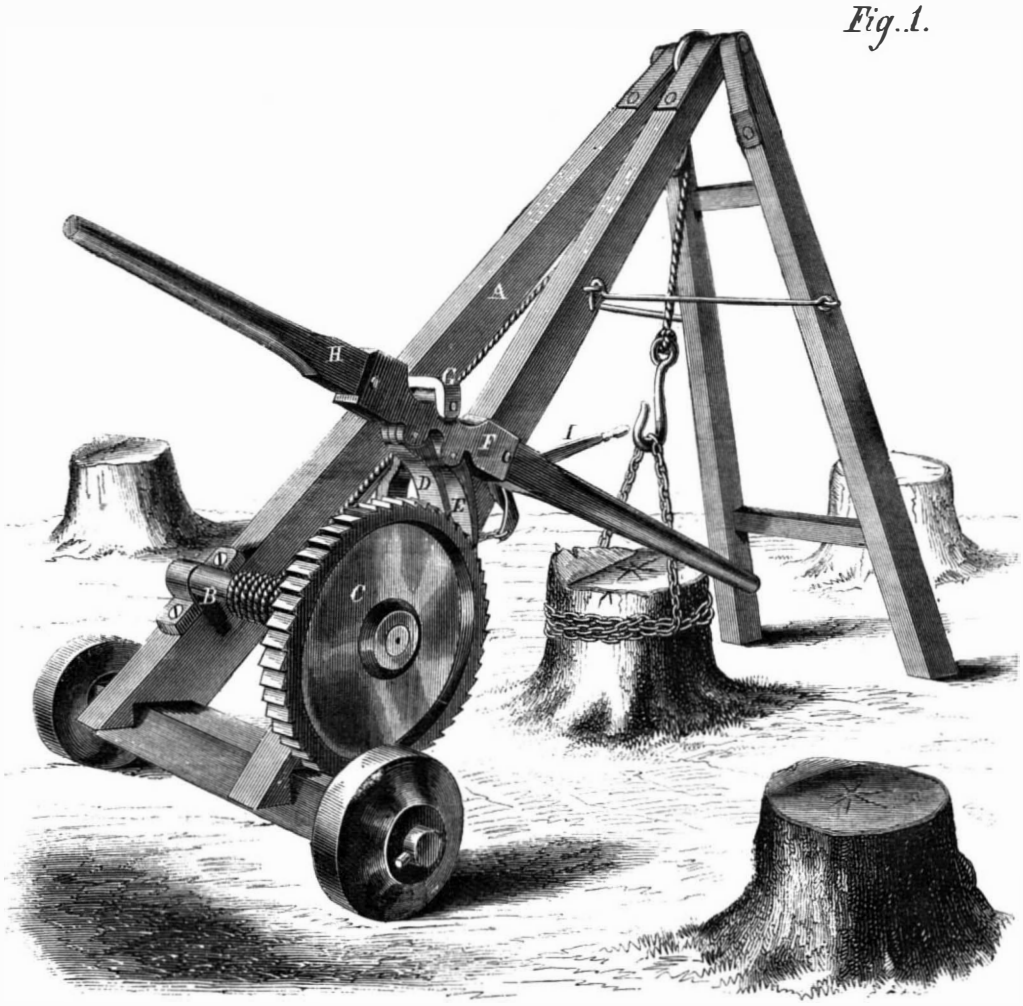
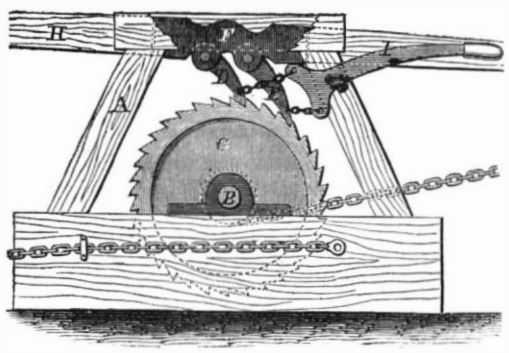


Fig. 2.



In Fig. 2 a section of this machine, in a reduced compass, is shown; the principle and formation of all parts is precisely the same. This arrangement of the power-exerting machinery permits it to be used on vessels for "warping-ship" or hauling on cables, or as a windlass for hoisting the anchor; in mines, for raising weights; in foundries, for castings; in short, in all places where a simple and efficient machine of its class is required.

The machine is now being introduced into the Charlestown (Mass.) Navy Yard for lifting heavy guns, and is highly spoken of by the officers of that station.

HOWE'S HERCULEAN LIFTING MACHINE.

It was patented through the Scientific American Patent Agency on September 17, 1861, by Franklin L. Howe, of Woodstock, Vt. It is now being made by the "Herculean Power Co.," of Lebanon, N. H; for further information address F. A. Cushman (the agent) as above.

Quick Photographs.

Mr. Bogardus, of this city, has constructed a camera-room with the light on the south side, by which he gets the full chemical force of the sun's rays directly upon the sitter, and he frequently takes a good negative in less than a second. To prevent the light from being unpleasant to the sitter, he passes it through blue glass which absorbs all but the chemical rays. In relation to this valuable improvement the editor of the *American Journal of Photography* remarks:—

"The grand problem in photographic portraiture for the past twenty years has been, how to make a photograph with the shortest exposure of the model. The attempts at solution are in two different directions, viz: the concentration of light, and the employment of more sensitive chemicals. The early photographers were wonderfully successful, by virtue of the working in the open air, chalking of faces, using of reflectors, camera lenses and mirrors of large aperture, screens of blue glass, and troughs of the ammonia sulphate of copper, &c.; and all this with the slow process which Daguerre gave to the world. The success was so great that photography would still be a practical art, even had there been no improvement in the chemical department. But the capital discovery of the quickening action of bromine was made, and we were at first so well content with our comparatively quick working that we abandoned our special appliances for the concentration of light. There were then no very notable improvements in either direction for ten years. The Daguerreotype was substantially perfected in 1841. In 1851, Archer gave us the collodion process, and it remains still, in respect of sensitiveness, but little better than when we received it. We feel vexed that we have so little to show for the last ten years; if all sympathize with us, and a great many shoulders are put to the wheel, something may be done speedily. Surely we can improve our practice with regard to lighting. Let it well be appreciated that the chemical process remaining the same, the time of exposure is rigidly proportioned to the amount of light. If it now requires ten seconds of exposure for a negative, and a babe can remain still but five seconds, you have only to get twice as much light and your negative is made in five seconds. All artists of course understand that by removing the stops from the lenses, the light is proportionally increased, but at the great expense of definition; this plan should not be resorted to, therefore, except when other expedients are unavailable. Increase the light falling on the model, should be the maxim. In direct sunlight portraits are made almost instantaneously; this is a capital fact—but how to make it serviceable is the question. If the direct sunlight be filtered through a pure blue medium, you eliminate everything which is obnoxious while the unadulterated actinic force is left to do its work. Light is wanted, the more the better; then give it a chance to enter. Skylights facing the north, to avoid the beaming face of our best friend, are unkind and absurd. These thoughts are reasonable, and they are not an untried theory. Mr. Bogardus has lately constructed a camera-room, which we propose to the profession as a model, where the correctness of the system of direct sun-lighting is demonstrated: the light looks toward the south, the sitter in a mild twilight is face to face with the sun; Mr. Bogardus often gets the very best negatives in a fraction of a second."

Humoring Disabled Engines.

When a double-screw engine breaks down, if the forward one alone is disabled (supposing the engines to be set fore-and-aft), the after engine may be used to work the ship into port. It sometimes happens, however, that the lead which is given to quick-working short-stroke engines is so great that a single engine will not turn the centers with it, the piston going ahead in the cylinder for a part of the stroke and then coming back again without a revolution. Instead of altering the eccentric, put the ship about before the wind, so as to help the screw, then give the sound engine steam and it will turn the center, lead or no lead, and will continue to work well, even though the ship be put head to wind again.

LARGE PROFITS.—The profits of the Massachusetts manufacturers during the past six months have been very great. Large sums have been carried to the reserve fund for the improvement or extension of the works, and dividends averaging ten per cent. in gold have been declared by twenty-three mills. These twenty-three mills, with a capital on the old specie basis of $26,340,000, pay, according to the *United States Economist*, an aggregate currency dividend of $1,763,200.

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THE GREAT NAVAL CONTROVERSY.

Most of our readers in the city are aware that a sharp controversy has been going on for the past two months, ostensibly concerning the economy of working steam expansively and the speed of naval vessels. As these topics seem to have very little relation to the controversy, we have made no mention of it hitherto, and only do so now in consequence of the complexion the matter has taken. To us, it is simply ridiculous. It beats Hudibras all to pieces, and "The Adventures of Dr. Syntax" are nowhere beside the developments which this controversy is making among engineers, shipbuilders and shipowners. In this wordy warfare the following gentlemen have successively engaged:—Mr. E. N. Dickerson, Mr. B. F. Isherwood, Mr. Secretary Fox, Mr. John Baird, Commodores Craven and Boggs of the Navy, a person named "Rutherford," claiming to be a "naval agent," Mr. Olyphant, Mr. Somebody-else whose name we have forgotten, Mr. T. F. Rowland, Mr. S. W. Jerome, President of the P. M. S. Co., and a number of other miscellaneous individuals whose names are not important. A brief synopsis of the controversy may not be wholly devoid of interest to our distant readers.

Mr. Dickerson, the inventor of a cut-off for steam engines, and a patent lawyer of considerable note, conducted a law-suit in Washington, some time ago, concerning the value of working steam expansively, which suit was decided in his favor, the jury awarding him a verdict of 34 per cent saving. We have now before us a pamplet of 80 pages, which contains not only the report of Dickerson's speech to the jury, but also marginal notes and references which are extremely interesting to engineering readers. The speech itself is a graphic and amusing production; it is a compound of science, sarcasm, and personality, fully equal in point of popular interest to any of the modern novels. Mr. Dickerson, in this remarkable speech, endeavors to show that the navy of our country is in a state of decay, owing chiefly to the incompetency of the engineer-in-chief, Mr. Isherwood. Dickerson insists upon the value of working steam expansively, with an independent cut-off; while Isherwood favors the use of a simple slide-valve, without any cut-off other than a link motion. Herein is the chief point where the dispute began.

Isherwood has responded to Dickerson's remarks; and his statements have, to some extent, been corroborated by Commodores Craven and Boggs. A race between a navy ship and a merchant vessel was then proposed by Mr. Dickerson, and, after much solicitation, was acceded to by the Navy Department. In planning this race, Mr. Dickerson trod on Mr. John Baird's toes by claiming certain parts of the racing merchant steamer's engine, which was to be pitted against a Government ship, as his own. Then arose a spicy discussion between Mr. Baird and Mr. Dickerson, in the course of which Mr. Baird says that Mr. Dickerson need not bother the navy for a race, since there is a yacht built by him (Dickerson) which he ought to stake against some other yacht. This was the unkindest cut of all, for this yacht was a very unfortunate piece of business, and can't get out of her own way under steam. According to her owner's statement, she made a brief but pleasant trip of two hours and a quarter, having in that time achieved the distance of two miles! The tide being adverse, the vessel was unable to make further progress, and it was with extreme regret that the survivors of this little trip put their bark about and returned home. To Mr. Baird's little suggestion, Mr. Dickerson replies by saying that he never built the engines of the yacht in question, and had nothing to do with her, other than to adapt certain old machinery to her.

Mr. T. F. Rowland, another engineer, builder of some of the Ericsson monitors, testifies that Mr. Dickerson's statement is correct. At this crisis another gentleman, no less a personage than the owner of the yacht, Mr. Jerome, appears in print, and says that, whether he (Dickerson) is responsible or not, it cost him (Jerome) $5,000 for the engines and boilers of the yacht in the first place, and that he has bills for a further sum of $16,000 additional for "adaptations," which, it appears, were not "happily arranged."

Dickerson, with his usual promptness, replied to Mr. Jerome's epistle; and, in the course of it, he perpetrates a characteristic joke, which is this:—A certain engineer, another party in this polyangular controversy, called on Dickerson, for the owner of the unfortunate yacht, and wished to know the size of the engine, that he might estimate the dimensions of a tug-boat it would drive economically. Dickerson says, he advised his visitor not to fix the size of the tug until the engine had been tried and its power was known. This strikes us as a novel and ingenious way of getting at the size of cylinder required to drive a certain number of inches of cross section through the water. Notwithstanding this reply, we doubt not that Mr. Jerome will still feel a little sensitive about the $21,000 expended on a yacht that could only crawl along at the rate of about one mile per hour in a smooth water; he probably thinks with Hudibras aforesaid—

"Alas! what perils do environ
The man that meddles with cold iron."

This is about the present stage of the "Great Naval Controversy," and we await further developments with the most intense interest, as almost every day a new character appears in the public newspapers, and we think that, before the bone of contention is satisfactorily disposed of, the navy will be forgotten altogether. We should not like to say anything to discourage these controversialists, and hope they will continue their diversion; for, certainly, nothing so very funny has turned up for years. Juvenal was a fool to some of these satirists; and, for acute wisdom and sound judgment, to say nothing of courtesy, the letters of "Junius," and Lord Chesterfield's advice to his son, are thrown far into the shade. Commend us to the "Great Naval Controversy" for interesting reading and engineering information.

AMERICAN ARMOR PLATES.

Our foreign files are full of interesting information concerning the endurance of armor plates for ships-of-war, and we frequently record the severe tests which have been applied to plates made by rival firms abroad. The war has very much deranged manufacturing operations among ourselves, and the immense demands made upon our large forges for other sorts of iron, or forgings of other shapes, doubtless conflicted with that deliberate and careful attention which the production of heavy armor plates requires. Whether this assumption is correct or not, it is encouraging to see that the importance of obtaining good plating at home is attracting the attention of shipbuilders and others. There are no better ores in the world than American mines produce; and these, under the skill of our iron-workers, should and do possess powers of resistance and tenacity which must be developed as much as possible. A recent letter in a Boston paper says that a test was had of the endurance of an American armor plate, made by the Nashua Iron Co., of Nashua, N. H. Compared with one of English manufacture the result was greatly in favor of the domestic plate—the English test being at 200 yards, while the Nashua Co.'s was at only 50 feet, a difference of 550 feet. The English plates were 5½ inches thick; the Nashua Co.'s were only 4¾ inches, a difference of three-quarters of an inch less. The test proving entirely satisfactory—not even a crack in the iron—plates are now being made by the Nashua Iron Co., for Wm. H. Webb, Esq., of New York, and by him applied to his celebrated war vessel, the *Dunderberg*.

Heavy armor plates are also made at the Franklin Forge, in this city, at Reading, Pa., at Bridgewater, Mass., and doubtless at other places. The armor for the iron-clad battery *Roanoke* (4½ inches thick) was all made at these several shops, and is doubtless fully equal to any made abroad. The *Ironsides* has also solid plating, which has withstood the rebel shot admirably. There is no question but that our mechanics and forges are capable of making the most tenacious plating in the world.

THE CAMPHOR STORM-GLASS.

Dealers in philosophical and optical instruments sell simple storm-glasses which are used for the purpose of indicating approaching storms. One of these consists of a glass tube, about ten inches in length and three-fourths of an inch in diameter, filled with a liquid containing camphor, and having its mouth covered with a piece of bladder perforated with a needle. A tall phial will answer the purpose nearly as well as the ten-inch tube. The composition placed within the tube consists of two drachms of camphor, half a drachm of pure saltpeter and half a drachm of the muriate of ammonia, pulverized and mixed with about two ounces of proof spirits. The tube is usually suspended by a thread near a window, and the functions of its contents are as follows:—If the atmosphere is dry and the weather promises to be settled, the solid parts of the camphor in the liquid contained in the tube will remain at the bottom, and the liquid above will be quite clear; but on the approach of a change to rain, the solid matter will gradually rise, and small crystalline stars will float about in the liquid. On the approach of high winds, the solid parts of the camphor will rise in the form of leaves and appear near the surface in a state resembling fermentation. These indications are sometimes manifested *twenty-four hours* before a storm breaks out! After some experience in observing the motions of the camphor matter in the tube, the magnitude of a coming storm may be estimated; also its direction, inasmuch as the particles lie closer together on that side of the tube that is *opposite* to that from which the coming storm will approach. The cause of some of these indications is as yet unknown; but the leading principle is the solubility of camphor in alcohol, and its insolubility in water, combined with the fact that the drier the atmosphere the more aqueous vapor does it take up, and *vice versa*.

HARD BOILING.

A striking evidence of the slowness with which knowledge is diffused is furnished by the frequent occurrence, in receipts for cooking, of directions to boil slowly or to boil rapidly for some specified length of time. It should at this day be know that anything will cook just as quickly in water boiling as slowly as possible, as it will in water boiling with the greatest fury. Water, under the pressure of the atmosphere and at the level of the sea, boils at 212° Fah., and as long as it is open to the air, no fire, however fierce, will heat it a single degree above this temperature. If we close the vessel, however, with an air-tight cover, so as to increase the pressure upon the surface of the liquid, we may heat it to any degree whatever. But, as the pressure increases with the temperature, the strength of the boiler must be increased in the same proportion. On the other hand, if the pressure of the air on the surface of the water is diminished by raising the vessel above the surface of the earth, the water will boil at a lower temperature than 212° Fah. It takes longer to boil potatoes on the top of a mountain than at its base, because boiling water at the top of the mountain is not so hot as at its base. In sugar refineries it is desirable to boil down the sirup at a low temperature in order to avoid burning the sugar. This is effected by putting the sirup into an air-tight boiler, and draining out a portion of the air from the space above the sirup by means of an air-pump worked by a steam engine. Such a boiler

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is called a vacuum pan, and is used in many other operations besides the refining of sugar.

THE WORLD'S INDEBTEDNESS TO SCIENCE.

Under the above title Professor Doremus delivered the first of a course of lectures at the Cooper Institute on the 8th inst. Long before the hour of opening the large hall was densely packed with the most intelligent, refined, and noted of our citizens, who manifested by their presence and subsequent attention the interest they had in the subject.

The lecture itself was a marked success; and, as a means of educating the public and imbuing them with a sense of the obligations they are under to the investigations of science, was all that could be desired. With a happy power of adapting himself to the capacity of his audience the lecturer unfolded, in a brief and accurate synopsis, the principal forces of the world; and announced that the subject of the "course" would be the Imponderable Agencies—such as light, heat, and magnetism; and he concluded this portion of the evening's entertainment by an eloquent tribute to the labors of savans in the earlier years of the past and present century. Professor Doremus also alluded to the claims of science as establishing, beyond cavil, the existence of a Deity or God; and he said that his first glance through the telescope and microscope filled him with an indescribable awe, and that the passage of scripture "What is man that thou art mindful of him" recurred to him with mighty force.

From this preliminary discussion (not by any means the least interesting portion of the lecture) Prof. Doremus passed to positive demonstrations of his topic for that evening—electricity and magnetism. The large stage of the hall was filled with scientific apparatus of the most costly character and huge proportions. A tremendous battery of 200 cups occupied the rear of the stage and the front was taken up with the apparatus previously mentioned. The first practical experiment was that of the individuality—so to speak—of the electric current; on bringing the two ends of the conductors leading from the battery in contact with each other a huge "spark", more properly a ball of light as large as one's fist, was evolved, accompanied by the usual manifestations of crackling, &c. After showing the existence of this awful force—"the nerve power of the world" as the lecturer called it—the application of it to the several uses of the telegraph, astronomical science, the electric light, the deflagration of metals, and the decomposition of water were successively exhibited, each experiment being attended with the happiest results. The electric light was of a most intense character, so much so that the gas burnt in the chandeliers looked like red stars, and the vividness of the illumination could only be compared to the solar beam. The lecturer demonstrated that this light possessed not only intense illuminating power, but had also chemical qualities akin to sunlight, and he proved this by taking a photograph on the stage of a bust of Franklin. The deflagration of gold, copper, tin, and steel was very perfectly done, and the experimental illustrations throughout were of the most satisfactory and convincing character. In the magneto-electric experiments an electric magnet, capable of exerting a force of five tuns, was used.

At the conclusion of the experiments Prof. Doremus made an appeal for the value of scientific instruction; and stated that New York, although the first city on the Western Continent in all other respects, was far behind her sisters in point of facilities for instructing youths scientifically. This state of things is much to be regretted; and it is to be hoped that the efforts of the lecturer, combined with the evidence of daily life, will awaken our citizens to the importance of founding a scientific institute of the first character. Other lectures of the course will take place on the 11th, 15th, and 18th of the present month.

Memorial of Navy Engineers to Congress.

The Engineers of the Navy have memorialized Congress upon the subject of increased payment, and also assimilating the rank of engineers as fixed by the Navy Department. The appointment of a higher grade of rank is also requested as an incentive to increased exertion and application on the part of the engineers to improve themselves in their profession. This higher grade is to be called Fleet Engineer and corresponds in a degree, we suppose, with the rank of Fleet Captain; it is also proposed that Congress shall encourage the education of engineers for the Navy so that a greater efficiency and a higher status of the profession will result therefrom. With all these objects we heartily sympathize. Upon no branch of the public service is there greater responsibility resting at present than the Navy, and the engineers of it should receive as many privileges and equal consideration and respect as the other professions represented in the service. We hope that Congress will grant the petition of the memorialists.

SPECIAL NOTICES.

MILTON FINKLE, of Utica, N. Y., has petitioned for the extension of a patent granted to him April 9, 1850, for an improvement in machinery for making wire heddles.

It is ordered that the said petition be heard at the Patent Office, Washington, on Monday, March 28, 1864.

ANSON ATWOOD, of Troy, N. Y., has petitioned for the extension of a patent granted to him May 14, 1850, for an improvement in stoves.

It is ordered that the said petition be heard at the Patent Office, Washington, on Monday, April 25, 1864.

JAMES BOGARDUS, of New York City, has petitioned for the extension of a patent granted to him May 7, 1850, for an improvement in the construction of the frame, roof, and floor of iron buildings.

It is ordered that the said petition be heard at the Patent Office, Washington, on Monday, April 25, 1864.

All persons interested are required to appear and show cause why said petition should not be granted. Persons opposing the extension are required to file their testimony in writing, at least twenty days before the day of hearing.

NEW BOOKS AND PUBLICATIONS.

ELECTRICITY AND MAGNETISM. Published by John Wiley, 535 Broadway, New York.

This is Part II. of Chemical Physics, by William Allen Miller, M. D., L.L.D., Treasurer and Vice President of the Royal Society; Vice President of the Chemical Society; Professor of Chemistry in King's College, London; Hon. Fellow of King's, London. It is a methodical and complete treatise written in a clear style and profusely illustrated.

Accidents from swallowing Leeches.

It appears from an article in the *Archives Générales de Médecine*, that the soldiers in Algeria are particularly liable to accidents of this description. At the time when the leeches are swallowed, they are so small as readily to escape detection; they are filiform, and rather resemble a blade of grass than anything else. They usually become attached to the isthmus faucium, or to the pharynx, and are sometimes found in the nostrils. When once they have become fixed, they generally remain for a considerable period, and undergo their development rapidly. Dr. Baizeau records a case in which they remained for more than six months within the pharynx. They very seldom come away of their own accord, and must usually be extracted forcibly. If they are too deeply seated to be caught by a forceps, then the patient must gargle his throat with a mixture of vinegar, water, and common salt, and must continue the process for several days. But even this sometimes proves unavailing. The symptoms are those of irritation in the part, together with occasional hemorrhage. The latter is often mistaken for a symptom of disease of the lungs, stomach, &c. The only preventive appears to be a caution to the soldiers not to drink water from streams, &c., when they are on the march. It is a remarkable circumstance that a leech can live so long a period under conditions so opposite to those it previously enjoyed, and bears out in some measure the views of those who class the Hirundinei with the Trematoda and Planaria.

WE are indebted to Dr. W. H. Allen, No. 18. West Eleventh street, for a copy of the "Transactions of the American Dental Association for 1863." The volume contains matter of much interest to the dental profession.

EVERY key that is slack in its seat should be driven tight; chafing back and forth soon cuts the seat off.

Missionaries of Art and Science.

About twenty years ago a Mr. John H. Chandler went from the United States to Siam as a scientific mechanic, employed by a missionary society to found type for them to print the Bible in Siamese. He was a thorough Yankee in the universality of his power of adapting all his knowledge to practical uses. The king of Siam sent for Mr. Chandler, who soon established a machine-shop for the king, and sent for encyclopædias, and made models and plates and gave instruction in the arts. A young nobleman of Siam, who is now the King's factotum in all these matters, used to come to Mr. Chandler by night and get Mr. Chandler to illustrate and demonstrate. The son of the Prime Minister of Siam has also largely enjoyed the instructions of Mr. Chandler, more especially in connection with steam power and its machinery, and is now doing much for his country in introducing the use of steam. Such have been the labors of one good man, not a minister, but a scientific mechanic. Now as to the results.

There is a large iron steamer plying between Siam and Singapore, owned entirely by natives; another, also owned by natives, between Siam and China. A little time since the king sailed with quite a fleet of steamers on an excursion. He contributed two hundred and forty dollars to build a Missionary Seminary, and sent a present of a thousand dollars to the widow of a missionary who had taught him English. He now employs a lady at a thousand dollars a year to teach his children English, and has established a mint, steam saw mills, and has gilding in gold and silver performed in European style. Private citizens are sending to England for machinery to make sugar, alcohol and rum. The gross amount of one order from one man was nearly forty thousand dollars.

Such has been the effect of the labors of one real Yankee in Siam, besides the good that he has done in casting founts of type for the printing of the New Testament. We cannot see why many enterprising young men, anxious for useful adventure and fortune, should not go out as missionaries of the natural sciences and arts, of medicine and of literature, apart from any direct works of a missionary character connected with any particular denomination or society. Indeed many Missionary Societies do send out medical men.—*Philadelphia Ledger.*

[This would be an excellent plan were it not for one little difficulty, the want of young men. The war has so decimated the number of working men that all trades are seriously retarded for want of hands, and we think the press of the country, should induce men to come to the country rather than advise them to look abroad for employment. The harvest time of workingmen in this country is yet to come; when the war is ended there will be a still greater demand for their services.—EDS.

Change of Color in Stars.

It is suspected by Admiral Smyth that a case of sidereal color-changing is now going on in the star "95 Herculis." Mr. Higgins has observed the same variability, which, he says, is sufficiently palpable after intervals so short as three or four nights. In the autumn of 1862 he records their colors as apple-green and cherry-red. In April last they were respectively greenish white and pinkish white; in May, both of a dull white; on August 1, greenish white and yellowish; whilst on August 12 they were apple-green and cherry-red. The first star showed signs of deepening color, and the latter changing from yellow to red more rapidly.

WHEN the teeth of gears "bottom," or the top of one tooth strikes in the recess of the opposite wheel, they make a great deal of noise; good clearance should be allowed, the wheels will then run much easier and with less jar and noise.

OUT OF NUMBERS.—We are unable to supply, of the current volume, Nos. 1, 3 and 4. Therefore all new subscriptions will begin hereafter with the time the money is received. We are out of the numbers above mentioned.

LEAKY gage-cocks corrode the boiler sheets under them very fast. Dripping pans should be provided.

STRONG soap-suds are just as good to use in drilling wrought-iron as oil; it is also much cheaper.

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RECENT SOUTHERN INTELLIGENCE.

From our recent files of Southern papers we collate the following items, which have greater or less significance :—

PATENTS.

The annual report of the Commissioner of Patents has been presented to the rebel Congress. We publish the following summary of this report :—

Last year there were 114 applications made, 47 caveats filed, 89 patents issued and 13 United States patents and assignments thereof, in whole or in part, recorded and revived. 1 patent was granted to a citizen of Bavaria; 33 to Virginia; 11 to Georgia; 9 to Missouri; 8 to Texas; 7 to North Carolina; 6 to Alabama; 4 to Mississippi; 4 to Louisiana; 3 to Kentucky; 2 to South Carolina; 1 to Arizona. 31 are for improvements in firearms, projectiles, implements of war and machinery. Of their manufacture a fair proportion has been adopted by the Government and proved to be practicable to the service. More than a third of the applications for patents are for inventions of this nature. A great number of illiterate men, far from sources of information, have arrived at facts which the science of the world has discovered through much toil and investigation, and sometimes never discovered till since this war, by men without the aid of science or information. The office is self-sustaining and no expense to the Government. The whole number of patents granted since the organization of the Government is 223.

The editor of the paper from which this extract is made complains of the telegraph operator, for the "stuff" which he sends over the lines. "What do we care," says he, "about the number of patents granted to the subjects of the King of Bavaria? That piece of news surely could very well have waited the regular course of the mails." It is evident that patents are not of much account in the "Confederacy."

PORK AND MEAT.

A Richmond paper complains that the Southern people are the greatest consumers of meat in the world, and thinks that the bravest and hardiest soldiers are fed on bread. Confederate commissary agents are now scouring the country to find out what heads of families have an excess of 150 pounds of pork. The delivery of hogs is now demanded by the Government agents, and the Richmond editor discourses as follows on this topic :—

The loss of our beef-raising territory west of the Mississippi, by the fall of Vicksburg and Port Hudson, reduced the supply of this article, and vigorous measures are needed to keep the troops in meat. The offal of the hogs, which is fit for food, such as the heads, backbones and spareribs, goes to supply this deficiency, and is barreled and shipped to the soldiers; such of the refuse from the slaughter-houses as cannot be eaten by the troops is necessary for soap grease; soap being an indispensable to the cleanliness, and hence to the health, comfort and self-respect of the soldiers; the lard is used as a substitute for bacon, and no portion of the hog is lost to the service.

Just how lard is used as a substitute for bacon is something that we do not quite understand; and just how they manage to "go the whole hog," so that no portion is lost, puzzles us; but this rebellion has upset modern gastronomic ideas.

NOT A RAG, BUT A FLAG.

The same paper complains that there has been "but little appreciation of the deeds of self-sacrifice and devotion on the part of the authorities of the army of Northern Virginia, and that not a single general order has recognized their gallant deeds, which equal those of the 'Old Guard' of Napoleon." Remarkable fact, that the Government which imports millions' worth of guns and munitions of war, cannot get a few gold and silver medals! The editor insists that "a flag—not a rag—shall be given, in the spring, to every regiment in Lee's army, with some imposing ceremonies." This editor is green enough to think that the rebel officials care for their "mudsill" troops.

RAW-HIDE SHOES.

Some of Longstreet's men are off on furloughs; they are represented as "tolerably well fed, but not tolerably well clothed and shod. More than one of these fellows have cow-skin moccasins of their own manufacture—the hair, of course, turned inwards, and supplying the place of socks. This shoeing is said to answer very well in dry weather, but rather indifferently in damp or wet times. When hides are taken off the cattle at the slaughter pen, men in need of covering for their feet are allowed to "cut out" and "make up" for themselves.

THE PEOPLE ABOUT TO GET CRAZY.

A correspondent, writing from Richmond to a South Carolina paper, says that some one has been "sounding" the Committee on Finance about money matters, and found out just enough to convince him that "we are to be taxed to our heart's content, and there is talk of making the tax payable in funds at specie valuation." In the meanwhile Memminger's presses are running day and night; and "so much was said about the noise made by th stamping machines on Governor street, that Mr. Memminger caused them to be muffled, lest the people should be driven crazy by their eternal click-clack." As if in despair, this writer says:—"Of what avail will be the wisest measures devised by Congress for the cure of the currency, if the head of the Treasury is incapable of applying them, or, as is charged, is under control of a clique of capitalists?" Speaking of the crazy finances one writer finds relief in the following :—"There is no reason why the present generation should pay all the cost of Confederate independence, but, on the contrary, the generation that comes after should bear its full proportion, for it will be much better able to do it."

THE NITER AND MINING BUREAU.

This Bureau has had aspersions cast upon it, as affording hiding and skulking places for unwilling conscripts who hold and owe allegiance to Virginia. Some Virginian has come to the rescue of this abused Department, and demonstrates that only 1212 are thus employed, consisting of "greasy mechanics" and negroes; and that this force is "absolutely necessary to carry on the development and production of gunpowder at the present rate of its extravagant expenditure in this gigantic war."

SMALL ITEMS.

Desolation reigns in that portion of Charleston within range of Gillmore's guns. A recent writer, who has passed over that ground, says that "perfect desolation and the silence of death all marked the spot as well deserted. No footfall save my own awoke the echoes in the cheerless streets."

The Atlanta *Appeal* has raised its subscription price to $4 per month.

Jenkins, a free negro from Goozeland, was arrested for the sin of selling pies at the railroad depot. John Roots (colored) was charged with the same grave offence. They were discharged, however, "with an admonishment." What's the matter down in Richmond that a free negro has to be arrested for selling pies? Are they made of dogs, that the servants should do such things? Matters have come to a pretty pass when a man can't sell a pie without being arrested.

Ben Davis was recently "brought up" for keeping vicious dogs and allowing them to go at large. The dogs made a dash at Alderman Sanxay and *came very near* biting him. His Honor the Mayor notified Ben that unless he removed his dogs out of Richmond they should be killed. A recent embargo on canal transportation and the pressure on the railroads have left Richmond like a cook without coal; and in consequence there are rows in the kitchen—the "old boy to pay and no pitch hot."

Baxter, a Richmond gunsmith, has been showing off, for some time, in his shop window, an elegantly finished rifle. Some enterprising thief has been reconnoitering this spot, courting the prize. So one night he sat down quietly under the window and with a jack-knife cut through the window bottom, and down came the rifle. Baxter awoke the next morning and of course found the window *rifled*. Where's the police?

COMPARISON BETWEEN AMERICAN AND ENGLISH TAXES.

Ever since the introduction and passage of the Internal Revenue Bill, a chronic dissatisfaction seems to have taken hold of a portion of the community, which complaint breaks out at various times with more or less virulence, according to the nature of the fancied aggravation. A comparison of the English schedule of domestic taxes and that of the United States is greatly in our favor, as will be seen by the following extracts which we make from printed lists of English taxes.

The tenant of every house, renting for $100 and upwards, pays a tax equal to 12 cents on every $5, or 6d. on each £1; and if the building is occupied in any other manner, 3d. is added to this rate. Male servants are taxed $5·25 each, per annum, for all persons over eighteen years of age; and every four-wheeled carriage is taxed $17·50—counting an English £1 as $5; horses and mules for drawing said vehicles are charged for at the rate of $2·62, on an average, and those specially used for carriages $5·25 per head. A dog of any sort must be paid for at the rate of $3; and *hair powder* or, the privilege of wearing it, $6 per annum.

In addition to the above the income tax must also be considered, which is for all incomes of $750 per annum $27, or 9d. in the £1 on all incomes of £150 and upward. On incomes of $500 per annum, 12 cents on $5, or 6d. in the £1 is exacted.

Licences for special trades and professions are rated as follows:—Auctioneers, $50 per annum; gamekeepers, $10; and licenses to kill game for one year, $15; also to deal in the same, $10 per annum; every unhappy soap-maker, $21; distillers of spirits $52·50; tobacconists, manufacturing 20,000 lbs. per year, $21·25; for omnibuses (each one), $15·75; bankers, $150; special marriage license, $25; not so *very* special $2·50; plate made in Great Britain, $4·25 per ounce (Troy) for gold plate; and silver plate, 35 cents per ounce.

Contrast the above figures with those which our own citizens pay for the support of the Government and the enjoyment of its privileges and protection. Look at the income tax, instead of being $27 on an income of $750, it is only $4·50, for by law only $150 out of the $750 is taxable with us; $600 being exempt. So that the laborer, the mechanic, and other hard-working members of the community, pay no income taxes whatever, unless their earnings exceed the $600 mentioned. The tax on house rent is also omitted in our schedule. House servants are not taxed, Carriages of the costliest kind, including the harness, the whole of the value of $600 and upward, are taxed at the rate of $10 only, where $17·50 is exacted in Great Britain for vehicles not half the value of those mentioned. Carriage horses are not taxed at all; it being beneath the dignity of the Government to levy on horses and mules; while the English, not so scrupulous, exact $2·62 cents for ordinary horses, and $5·25 for extraordinary animals or carriage horses. Hair-powder we do not consider at all; if there are persons in the Old Country silly enough to dust their heads and pay six dollars a-year for the privilege of doing so, they are exceptions to civilized beings, and not recognized as taxable subjects in this country. Dogs in England pay, or are paid *for*, at the rate of $3 *per capita*, per year; while with us they go "scot free," except under taxes of certain States, each of which has its own law.

To come to trades and professions. Auctioneers in the Old Country pay $50 per annum for a license; here they pay $20 for the same. Soap-makers abroad pay $21 for a license to manufacture; here they pay $10. Bankers $100 here, against $150 in Great Britain. Silver plate made in England, 35 cents per oz.; the same article here 3 cents per ounce (Troy), and gold plate, kept for use in both cases, at the same rate as silver—3 cents per ounce (Troy); in England, however, gold plate is taxed at the rate of $4·25 per oz. (Troy).

An auctioneer in England, having an income of $750 per year, therefore, has to pay about the following amount in taxes:—

Auctioneer's license	$50 00
For a male servant	5 25
For a carriage for business purposes	17 50
For a horse for drawing the same	2 62
For a dog	3 00
Tax on rent of house ($150 per annum)	3 60
Income tax	27 00
Total	$108 97

Comment is superfluous.

£28,000,000 are annually required to pay the interest on the national debt of Great Britain. In view of this fact it is not extraordinary that such outrageous taxation has to be borne by the people. In the estimate of American taxes we have not included the burthen imposed upon the people in the shape of the duty on tea, coffee and sugar, and all articles of necessity, for the reason that the case is the same in Great Britain, and therefore the account is balanced. A man (suppose an auctioneer) with $750 a year income, in this country, pays the following amount in taxes:—

Auctioneer's license	$20 00
For a male servant	Exempt.
For a carriage for business purposes	
For a horse for drawing the same	
For a dog	
Tax on rent of house	
Income tax	4 50
Total	$24 50

Against $108·97 in Great Britain.

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The preceding statistics illustrate the different amounts of taxation at present levied on similar articles in Great Britain and the United States; but the following items still more vividly exhibit the excessive taxes which poor Mr. Bull pays to grease the machinery of royal government. The sums set down in pounds, shillings and pence (sterling), can be easily estimated, at a glance, by reckoning £1 equal to $4·44; ten shillings equal to $2·22, and one penny equal to two cents:—

GREAT BRITAIN.	£	s.	UNITED STATES.	$	cts.
Attorneys	9	0		10	00
Fire Insurance, on every £100 insured for 1 year	0	3	*Three per cent* on all dividends		
Horse-dealers	25	0		10	00
Hounds, pack of 66 dogs	39	12		Exempt.	
Legacies :—					
Lineal issue or ancestor of deceased, per £100	1	0	Same individual or brother or sister, per $100.	75	
Brother or sister or a descendant from either	3	0	A descendant from the brother or sister	1	50
Brother or sister of the father or mother or a descendant from either	5	0	Same individual	3	00
Brother or sister of the grandfather or grandmother or a descendant from either	6	0	Same individual	4	00
Any other degree of collateral consanguinity or a stranger in blood to deceased	10	0	Same individual	5	00
Husband or wife	Exempt.		Same individual	Exempt	
Livery-stable keepers, not exceeding 4 horses or 3 carriages	20	0	Any number of horses or vehicles	10	00
Malt, per bushel	0	2½		Exempt	
Medicines per packet, box, bottle, &c., under 4s. of retail price, 6d.			Under $1 of retail price	04	
Pawnbrokers	15	0		50	00
Peddlers (on foot)	2	0		5	00
Plate-dealers, gold and silver	5	15		Exempt.	
Playing cards, all qualities, per pack, 3d.			Common quality	01	
Playing-card manufacturers	1	0		Exempt.	
Power-of-attorney, for transfer of stocks, &c.	1	10		25	
Race-horses, each	3	17		Exempt.	
Railways, *five per cent.* on all sums received from passengers			*Three per cent*		
Spirits, first proof, per gallon	0	10		20	
Stamps, penalty for giving receipts for over £100, without	20	0		50	00
Stamps, penalty for not canceling adhesive	10	0		50	00
Sugar, refined, per cwt.		18¾	Same quality 2 mills pr lb		

In the face of such evidence as the above, how can any reasonable person grumble or complain of the share he is obliged to bear in supporting the war?

RECENT AMERICAN PATENT.

Circular Loom for Weaving Hats.—This invention consists in certain novel mechanism, arranged and constructed in circular form, whereby the hat is commenced at the center of the crown and finished to the edge of the crown complete, either plain or with a twill, and in shape to fit any sized head. The crown may be made taper, oval or bell-shaped, as may be desired. We have seen specimens of hats woven by this loom, which are of excellent quality; and we think they will commend themselves to the public. P. L. Slayton, of New York city, is the inventor.

BLACK skunk skins are worth in this market one dollar apiece, and black-and-white ones fifty cents apiece, by the thousand.

TO OUR READERS.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and enclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

INVARIABLE RULE.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

MODELS are required to accompany applications for Patents under the new law, the same as formerly, except on design patents, when two good drawings are all that are required to accompany the petition, specification and oath, except the Government fee.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona-fide* acknowledgement of our reception of their funds

Binding the "Scientific American."

It is important that all works of reference should be well bound. The SCIENTIFIC AMERICAN being the only publication in the country which records the doings of the United States Patent Office, it is preserved by a large class of its patrons, lawyers and others, for reference. Some complaints have been made that our past mode of binding in cloth is not serviceable, and a wish has been expressed that we would adopt the style of binding used on the old series, *i. e.*, heavy board sides covered with marble paper, and morocco backs and corners.

Believing that the latter style of binding will better please a large portion of our readers, we commenced on the expiration of Volume VII., to bind the sheets sent to us for the purpose in heavy board sides, covered with marble paper and leather backs and corners.

The price of binding in the above style is 75 cents. We shall be unable hereafter to furnish covers to the trade, but will be happy to receive orders for binding at the publication office, No. 37 Park Row, New York.

ISSUED FROM THE UNITED STATES PATENT-OFFICE

FOR THE WEEK ENDING FEBRUARY 2, 1864.

Reported Officially for the Scientific American.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

41,418.—Knapsack Hammock.—Granville Abbott (U. S. A.), Rumford, Maine:

I claim the back, B, formed of water-proof material lined with canvas cloth, A, with an extension, M, at each end to form hoods or covers for the head and feet of the occupant when used as a hammock, in combination with a water-proof blanket, E, suspension cords, I I, and line, F, the former passing through hems in the sides of the back, B, when the whole is constructed and arranged so as to form a convertible knapsack hammock and litter, in the manner described.

41,419.—Grinding Saws.—J. G. Baker, Washington, D. C. Ante-dated Jan. 22, 1864:

I claim, first, Grinding saws by means of two traversing grindstones, set at an angle with each other.

Second, Feeding saws to be ground, between two revolving grindstones, by means of the frame, I, and feed rollers, J.

Third, The expansion-cranks, G, in combination with the slotted traverse-bar, F.

Fourth, The frame, I, in combination with the rollers, J, and spring, g.

41,420.—Book-holding Stand.—J. S. Brown, Washington, D. C.:

I claim supporting the table, or desk, by an indirect or side standard or support, extending from the base, in order that the space between the base and table or desk may be clear, and at the same time the table or desk be centrally or properly sustained by the base, substantially as and for the purpose herein specified.

41,321.—Hot Blast Oven.—R. E. Brown, St. Louis, Mo.:

I claim, first, The employment or use of fire-clay or other equivalent earthen material, in the construction of the heating pipes, chambers, or vessels, used as air passages within hot blast ovens, substantially as herein described, for the purposes set forth.

Second, I claim the employment of the annular rings or stops, e, in combination with the cylinders, b c, substantially as and for the purpose specified.

Third, In combination with the pipes, g and k, and also with the cylinders, b c, I claim the connections, h, constructed and arranged to operate substantially as represented.

Fourth, The arrangement of the connections, h, pipes, g and k, and their necessary joints, with reference to their heating cylinders, when the same are arranged outside the oven, and constructed in such manner as to be removable from the said cylinders, as and for the purposes set forth.

41,422.—Brush for Mucilage Bottles.—William Burnet, New York City:

I claim the combination of the brush-handle, C, with the screw, D, the spring, E, and the cover, A, when arranged and operating substantially as and for the purposes described.

41,423.—Cultivator.—Jarvis Case, Lafayette, Ind.:

I claim, first, The combination of the pivoted stocks, D D', with the arms, O, and pivoted bar, N, operated by the stirrups, K, and lever, M, or by either of the same, substantially as set forth.

Second, I claim placing the treadle, P Q, and stocks, D D', forward of the driver's seat, the same being arranged and operated substantially in the manner and for the purposes specified.

Third, I claim the hinged stock-holders, H, for holding the stocks, E, and allowing the latter to rise in relation to the irame, substantially as described.

41,424.—Potato-digger.—Otis N. Chase, Boston, Mass. Ante-dated Jan. 27, 1864:

I claim, first, The diggers, e and f, constructed and operating substantially as described, when combined with the frames, A and C, and toggle lever, d, for the purposes set forth.

Second, I claim the frames, A and C, with the toggle lever, d, constructed and operating substantially as described.

Third, I claim the combination of the pickers, g g, with the conical screw and hub, substantially as described, for the purposes set forth.

Fourth, the combination of the pickers, g g, conical hub and screen (conical or otherwise), with the inclined screen, I, all substantially as described.

41,425.—Closing Preserve Cans.—Timothy Earle, Valley Falls, R. I.:

I claim the combination of a spring, b, with a yoke, A, for the purpose of securing the cover of a preserve jar, applied in the manner substantially as described.

41,426.—Marine Railway.—C. H. Edwards, Quincy, Mass.:

I claim the construction of the ways of a marine railway, so that the upper surface upon which the rolls traverse shall form a vertical curve substantially as described, and for the purpose as set forth.

41,427.—Chimney Top.—George Elbreg, Cincinnati, Ohio:

I claim the chimney top, A A', having the described lip deflectors, B E, recesses, C, and ventages, D, substantially as and for the purposes set forth.

41,428.—Restoring Phosphatic Guano.—Louis Harper, Brooklyn, N. Y.:

I claim the process above described of improving pacific or phosphatic guano in its quality as a fertilizer.

41,429.—Churn.—Samuel Gessinger, Manchester, Pa.:

I claim the combination and arrangement of the wings, q, disk, m, breakers, t, and dashers, l and o, constructed arranged and operating in the manner and by the means herein described and for the purpose set forth.

41,430.—Coal Stove.—W. H. Goeway, Albany, N. Y.:

I claim the chambers, G and H, separated by the intermediate cylinder, I, the diaphragm, K, provided with the pipes, g, and openings, h, and the space, L, communicating with the exit pipe, in combination with the fire-pot, C, having pipes, d d, and the magazine, D, of a base burning stove, the whole arranged and operating substantially as herein set forth.

41,431.—Manufacturing Illuminating Gas.—William Elmer, New York City. Ante-dated in France, August 29, 1863:

I claim, first, The process of transmuting into illuminating gas the liquid products obtained in the gas manufacture by decomposing them by heat in the presence of the light carbides of hydrogen, or hydrogen given off by the gas stock during the latter part of its distillation, the said process being conducted substantially as above set forth.

Second, The process of transmuting liquid hydrocarbons into acetylene by decomposing them at a high temperature in the presence of heated hydrogen produced by the decomposition of water, the process being conducted substantially as above set forth.

Third, The process of transmuting deposited carbon into acetylene, by subjecting it to a high temperature in the presence of heated hydrogen, produced by the decomposition of water, the process being conducted substantially as above set forth.

41,432.—Catoptric Lighting Apparatus.—William Hodgins, Albany, N. Y.:

I claim the perforated ornamental frame, A, secured to the opening or chamber, B, and provided with the hemispherical glass shade or basin, C, and reflectors, H, enclosing the burner, E, and forming a combined lighting and ventilating apparatus, substantially as set forth.

Second, I claim the independent smoke-pipe, I, provided with the outer casing, J, and opening, K K, when used in combination with the opening or chamber, B, and valves or covers, M N, substantially and for the purpose specified.

41,433.—Horse Rake.—James Hollingsworth, Chicago, Ill.:

First, I claim the combination of a rocking frame and jointed bearings for the rake teeth, substantially as and for the purpose set forth.

Second, Sustaining the forward extensions of the rake teeth upon bearings, substantially in the manner and for the purposes specified.

Third, The adjustable forked bearings, n, or their equivalents, substantially as and for the purpose specified.

Fourth, The combination with a rocking frame and adjustable brackets, D D, of the extended rake teeth, h h', and intermediate jointed bearings for said teeth, substantially as and for the purposes described.

Fifth, Making the forward portion of each rake tooth serve as a spring for keeping the rear or raking portion down in place, substantially as described.

41,434.—Burner for Vapor Lamps—J. S. Hull, Cincinnati, Ohio:

I claim the perforated plate, C, forming the bottom of a chamber, B, which first receives the mingled gasses and air, and transmitting the same to another chamber, D, below, substantially as and for the purposes herein specified.

I also claim the apron or screen, f, arranged and operating substantially as and for the purposes herein set forth.

I also claim the flange plate, G, constructed and operating substantially in the manner and for the purposes specified.

41,435.—Cultivator.—M. H. Hullinger, Granville, Ill.:

I claim, first, The peculiar arrangement of the shanks, G, united by the double-jointed brace, M, and provided with rollers, T, working in the slot, x, substantially in the manner and for the purposes set forth.

Second, I claim the double-jointed brace, M, for connecting the shanks, G, thereby enabling the driver to keep the plows in place when the shanks, G, are five feet or more in length, substantially as set forth.

Third, I claim the combination of the rollers, T, and windlass, D, the former operated by the driver's feet and the latter by his hands, substantially in the manner and for the purposes set forth.

Fourth, I claim the arms, L, and shaft, S, for making the driver's seat adjustable, as specified.

41,436.—Copper Roaster.—Edward Hyde, Philadelphia, Pa.:

I claim, first, The rotating vessel, D, of suitable form hinged to a frame, substantially in the manner and for the purpose herein set forth.

Second, The rotating vessel with its hollow journal, b, in combination with the plug, H, and its semi-tubular continuation, or their equivalents for the purpose specified.

41,437.—Joint for Railroad Rails.—R. H. Lamborn, Altoona, Pa.:

I claim the use of the channel-bar, C, in combination with the yokes or clevises, B B, fastened under the said channel bar in any suitable manner (for the purpose of securing the ends of the track rails as described), the same being constructed and arranged together substantially as described and set forth.

I also claim in combination with the track-rails, channel-bar, and yokes or clevises, arranged together as described, the employment of the wedge-keys, D D, for the purpose of fastening the said parts together, as described and set forth.

41,438.—Washing Machine.—Benjamin I. Lane, South Framingham, Mass.:

I claim the said hand washing implement, the same consisting of a series of rollers made in whole or in part of India-rubber or guttapercha or their compounds, and arranged within a frame in the manner and for operation, substantially as specified.

41,439.—Grinding Mill.—John A. Lechler, Philadelphia, Pa. Ante-dated Jan. 20, 1864:

I claim forming in the shells and burrs of grinding mills inclined dove-tailed grooves, and fitting into the same the detachable dove-tailed strips, e, of steel, the said strips having cutting edges, all as described for the purpose specified.

41,440.—Bottling Machine.—John Matthews, Jr., New York City:

I claim the combination of a plunger having fingers or prongs, which enter the bottle and seize the stopper, with the filling head of a bottling machine, the whole operating substantially in the manner described and for the purpose set forth.

41,441.—Plating Machine.—J. T. McKenney, Baltimore, Md.:

I claim a machine constructed with folding plates, G G H H, scroll guide, I, and feeding and pressing rollers, C C', adapted to operate substantially as herein described.

41,442.—Wind-mill.—John H. Morse, Peoria, Ill.:

I claim the regulator, b, and governor, R, or their equivalent acting upon the movable half of circular track, H, by means of levers, P P P, or their equivalents, in the manner and for the purpose herein specified.

41,443.—Extension Ladder.—M. D. Myers, Ilion, N. Y.:

I claim the construction and combination of an extension ladder composed of two or more sections with the bands, B, to connect the same together, and the pawls, J, to hold them in position when raised to the proper hight, said pawls being operated by means of the springs and catches in the manner and for the purpose herein described.

41,444.—Sewing Machine.—Heinrich Pollack & Edwin Schmidt, Hamburg, Germany:

We claim the hinged face wheel and sliding collar for varying the inclination of the face wheel, substantially as described, in combination with the rotating arbor and reciprocating feed bar, substantially as and for the purpose specified.

41,445.—Construction of Houses.—Wm. Ortwine, Baltimore, Md.:

I claim, first, In combination with the open perpendicular court extending from the basement up between the front and rear rooms of the house, also the arrangement of the passage from the parlor to the dining-room with the pantry, S', back stairs, U1 U2, and closet, R2, for the first floor or principal story of the house.

Second, I also claim the arrangement of the bath-room, V2, passage, X, backstairs, Z Z', and closet, V, for the second story of the house.

41,446.—Steam Hoisting Apparatus.—John S. Neal, Madison, Ind.:

I claim, first, A steam hoisting apparatus arrested automatically at either termination of its stroke, substantially in the manner explained.

Second, The combination with the cylinder, B, and piston, C, of the sliding pipe, E', and spring, F', operating substantially as and for the purposes explained.

Third, The conducting pipe, G, operating in connection with the piston, C, and cylinder, B, substantially as and for the purposes set forth.

Fourth, The hollow-rod, H, operating in the manner explained to regulate and control the escape of air or steam from the upper end of the cylinder, B.

41,447.—Beer Pitcher.—D. W. S. Rawson, Peru, Ill.:

I claim, first, The closing of the vessel at the mouth, substantially as herein described.

Second, I claim a ventilator closed by the liquid and opened by changing the position of the vessel so that the liquid may run out of the air passage, substantially as herein described.

Third, I claim a spout so arranged as to retain, when in its usual upright position a sufficient quantity of liquid to prevent a passage of air or gas to or from the liquid contained inside.

Fourth, I claim the arrangements for closing the mouth ventilator

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and spout substantially as herein described, when used for the purposes herein described.

41,448.—Leather-splitting Machine.—J. A. Safford, Boston, Mass.:

I claim, first, The spring, C, constructed and operating substantially as set forth.

Second, I claim the spring, C, in combination with the lower or feed roll, B, the whole constructed and operated as described and for the purposes as herein set forth.

Third, I claim the knife constructed as herein described in combination with the lower or feed roll, B, for the purposes herein set forth.

41,449.—Gang Plow.—Marshall Sattley, Taylorsville, Ill.:

I claim, first, Attaching the beam, K, to the frame by means of cranks, S V, operated by a lever, T, in the manner explained.

Second, The draft chains, L R, attached adjustably to the axle, B, and adapted to be drawn tight by lowering the plows to their working position.

[This invention consists in a peculiar and facile manner of raising and lowering the plows and in a certain novel and effectual arrangement of devices for bracing the same.]

41,450.—Breast Strap Slide.—Samuel Selleck, Rosendale, N. Y.:

I claim a breast strap slide in which friction rollers so located as to bear upon the strap and relieve it from friction are combined with a frame, substantially as and for the purpose set forth.

41,451.—Fastening Hinged, Sliding or other Bodies.—Leander R. Streeter, Chelsea, Mass.:

I claim the fastening of hinged, sliding or other bodies, by means of a ball confined in a socket and operated by a spring, substantially as described.

41,452.—Marine Railway.—Wm. Talbot, Washington, D. C.:

In combination with the cradle of a marine railway I claim a rail track on the cradle with one, two, three or more movable blocks or cars for the purpose of raising the fore foot of a vessel, with the vessel itself on to the cradle, substantially as described.

Also in combination with the above mentioned movable blocks or cars, I claim the chains which connect the cars and place them at proper distances apart under the vessel as she is drawn on to the cradle, substantially as described.

41,453.—Flocking India-rubber Goods—Frederick R. Taylor, New York City:

I claim, first, The application of the dissolved glutinous cement and flock to the rubber, or other substances after it or they have been vulcanized or cured, substantially in the manner described.

Second, I claim the vulcanizing or curing of the gum after it is applied to the vulcanized cured or unsulphured rubber or other substance, substantially in the manner described.

41,454.—Cultivator.—E. W. Vangundy, Galesburg, Ill.:

I claim my improved manner of conecting the same by means of the peculiar arrangement of the pivoted yoked connecting bars, E, with shank, f, working in and through the slotted or open straight bar, F, in combination with the draught beams, A A, the whole operating substantially in the manner and for the purpose herein set forth.

41,455.—Skate.—Edward Vorster, Brooklyn, (E. D.,) N. Y.:

I claim providing the upper end of the heel-bolt, C, with a fixed shoulder, c, and forming a lock with the runner. B, at its lower end; so that by attaching the fore end of the runner in the usual way, the heel-bolt and back end of the said runner are at once firmly secured to the stock of the skate.

41,456.—Artificial Limbs.—James W. Weston, New York City:

I claim, first, An air cushion between the stump and socket, substantially as and for the purposes specified.

Second, I claim the cylindrical band or pipe, d, of india-rubber applied at the end of the artificial limb to form a cushion for the weight to rest upon as set forth.

Third, I claim the adjustable ring, c, fitted substantially as specified to form a thigh-conformer as set forth.

41,457.—Damper.—N. W. Wheeler, Ripon, Wis::

I claim the wheels, B and C, the plates A, and the pivot, F, the whole constructed and arranged substantially as herein set forth.

41,458.—Leather Dresser's Table.—C. T. Woodman, Boston, Mass.:

I claim the use of a glass, porcelain, or potters' ware plate for the surface of a leather dresser's table, in combination with a gutter and the elevating screws, for the purpose set forth.

41,459.—Machine for cutting Leather Fly-nets.—Alva Warden, Ypsilanti, Mich.:

I claim the arrangement of circular knives upon a revolving cylinder so that on passing a strip of leather under the cutting cylinder uniform incisions will be made in the leather with uniform breaks in each alternate row of incisions so that the leather when cut by the machine forms a diamond net-work.

41,460.—Mowing Machine.—Rufus Duston, Brooklyn, N. Y., assignor to himself and A. B, Allen, New York City:

I claim the arrangement and combination of the gearing with the side plates of the casing inclosing the said gearing, and constituting journal bearings therefor, when such plates are made in a single piece of metal substantially as set forth.

I also claim the arrangement and combination of the double-armed rock-shaft, operating in a sleeve, with the short lever, 10, and in the intervening link, for lifting the finger bar, substantially in the manner and for the purpose herein set forth.

41,461.—Improvement in Watches.—C. W. Fogg (assignor to the American Watch Company), Waltham, Mass.:

I claim attaching one end of the balance spring, c, to a vibrating lever, the vibrations of which are controlled by an adjustable stop or stops, substantially as described, for the purpose specified.

41,462.—Carding Engine.—D. T. Gage (assignor to himself and M. A. Furbush), Philadelphia, Pa.:

I claim the eccentric sleeve, h, with its handle, i, and the shaft, K, the whole being arranged and operating substantially as set forth, in conjunction with the system of gearing herein described, or any equivalent to the same, for stopping and starting the feed rolls of carding engines.

41,463.—Canal Wicket.—John D. Marshbank, Lancaster, Pa., assignor to himself and Wm. McConky. Antedated Dec. 21, 1863:

I claim the construction of the movable journals to be fitted on securely to the ends of a wicket, so as to be easily replaced by new ones, when worn, substantially as herein described.

Second, I also claim the combination of the journals, D, with the sockets, C, and ledges, B, as herein described and for the purposes set forth.

41,464.—Cooling and tempering Cast-steel Plow Plates.—F. F. Smith (assignor to himself and S. W. Collins, President of the Collins Company), Collinsville, Conn.:

I claim the cooling and tempering of cast-steel plow plates, substantially in the manner and for the purpose herein described.

42,465.—Lady's Head-net.—David M. Smyth (assignor to himself and S. N. Lewis), New York City:

I claim a lady's head-net united at the points of intersection of the strips of material, by metallic clasps, for the purposes and as specified.

41,466.—Circular Loom for Weaving Hats, &c.—P. L. Slayton (assignor to C. S. Mitchill), New York City.

First, I claim the employment, in a circular loom, of two separate and distinct sets of weaving mechanism, one suitable for weaving in a flat or nearly flat form, as required for the top of the crown and brim of a hat, and the other suitable for weaving in a cylindrical or hollow form, as required for the side of the crown of the hat, and the two so constructed and arranged that the warp may be transferred from one set to the other, to change the form of the weaving substantially as herein specified.

Second, In a circular loom having two separate and distinct sets of weaving mechanism, such as above specified, I claim making one set movable or adjustable relatively to the other in a direction parallel with the axis of the loom, substantially as and for the purpose herein specified.

Third, I claim the combination of the plate, R, and forming shuttle, J° y°, applied and operating in a circular loom, substantially as and for the purpose herein specified.

Fourth, I claim the ring, U, employed in combination with a plate, R, or its equivalent, to hold and secure the vertical part of the crown after the latter has been formed by the shuttle, J° y°, substantially as and for the purpose herein set forth.

Fifth, I claim the combination of a circular loom of a series of revolving rings, n n p, or m° n° p°, or their equivalents, and an attached toothed or notched wheel, H, or pair of toothed or notched wheels, H° H°°, to separate a series of warp-carriers, the whole operating substantially as and for the purpose herein specified.

Sixth, I claim the shuttle, J° y°, constructed substantially as herein described, in the form of a nearly complete ring whereby it is made to serve the two purposes of depositing the filling in the warp in weaving the side of the crown of the hat and of gathering in the warp and regulating the size of the side of the crown of the hat, substantially as herein set forth.

Seventh, I claim the employment, in a circular loom, of wheels or rollers so applied as to press up the filling in the warp by means of rolling friction, when used in combination with a presser bar, I, substantially as herein specified.

RE-ISSUES.

1,611.—Railway Carriage.—N. F. Bryant, East Boston, Mass. Patented Aug. 18, 1863:

I claim constructing a car truck with divided axles, or an axle to each wheel, such axle being supported or journaled at each end thereof, that the opposite axles are movable toward or from the longitudinal centre of the car, the construction being for the purpose of adapting the car to tracks of different gages, as set forth.

I also claim the automatic combination, consisting not only of the chocks, or their equivalents, applied to the truck frame and wheels, and the check rails, or their equivalents, applied to the track, but the two tracks of different gages and their wheel-changing track, or the same and its flange-guide rails, the whole being arranged and so as to operate substantially as specified.

And in combination therewith I claim the projections or guides, n n, for the purpose specified.

1,612.—Apparatus for drawing Soda Water.—William Gee, New York City. Patented May 19, 1863:

I claim, first, a valve, B, and its front A D E F, and openings, C, in combination with valve, H, and its port, forming a cock, for the purposes set forth.

Second, I claim drawing soda water from a small and large opening, having one connection with a draught tube or soda water apparatus.

Third, I also claim the small opening, M, for the purpose of compressing the soda water while being admitted into the large opening, C, and outlet, for the purpose set forth.

1,613.—Hay Elevator.—George W. Gregory, Binghamton, N. Y., assignee of E. W. Seymour and G. W. Gregory. Patented June 9, 1863:

I claim constructing a hay-elevating fork, in such manner that while the head revolves, the handle attached centrally thereto remains in a vertical position.

Second, In combination with the revolving head and vertical handle, and strap or band passing around the head near or at its center and attached to the handle in which the head revolves.

Third, The sustaining eye, or its equivalent, through which the hoisting rope passes, for the purpose of keeping the fork in a proper position.

Fourth, The latch, E, and the spring catch, F, in combination with the revolving head, A, handle, C, and sustaining eye, H, as and for the purpose herein described.

1,614.—Harvesting Machine.—W. M. N. Whiteley, Jr., Springfield, Ohio. Patented Nov. 25, 1856. Re-issued June 25, 1861:

I claim the combination of the main frame of a harvesting machine with the main ground and driving-wheel's pinion shaft on the frame, the sector plates, f f', and the sliding or adjustable boxes, g g', or their equivalents, so that the attendant of the machine can both vary the distance of the frame from the axle of the driving wheel, and its distance from the pinion shaft, while the axle remains in said sliding boxes in which it revolves, for the purposes set forth and described.

Second, In combination with the sector plate, f, a projecting lip, for the shipper's fulcrum pin, substantially such as is shown and described, for the purposes specified.

Third, Retaining the pinion on its shaft by means of the shipper, or its equivalent, by which said pinion is thrown in and out of connection with its clutch pin, substantially as shown and described, for the purpose stated.

Fourth, So connecting or combining the driver's seat of harvesting machines with the front end of the frame of the same, when used for reaping, that when the driver is on his seat, his weight will do either raise and hold up the rear end of the wheel frame, to which the cutting apparatus is connected, or both the rear end of the frame and the center of the finger bar, for the purposes specified.

1,615.—Harvesting Machine.—Wm. N. Whiteley, Jr., Springfield, Ohio. Patented Nov. 25, 1856. Re-issued June 25, 1861:

I claim, in combination with a harvester's platform, which is behind its cutting apparatus, an automatic rake having its outer end moved faster over said platform than its inner, by a crank and pitman.

I also claim providing said crank with suitable mechanism, so that the driver on his seat can lock the crank to or relieve it from its shaft or driving mechanism, so as to make the rake remove the gavels from the platform more or less often while the machine is in motion, and make the gavels a proper size for binding into sheaves where the grain is thin on the ground.

DESIGNS.

1,894.—Plate of a Stove.—N. S. Vedder, (assignor to Cox & Church), Troy, N. Y.

1,895.—Metal Pulley Block.—N. C. Whitcomb, Oak Hill, N. Y.

PATENTS

GRANTED

FOR SEVENTEEN YEARS!

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MESSRS. MUNN & CO.:—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the office, a marked degree of promptness, skill, and fidelity to the interests of your employers. Yours very truly,

CHAS. MASON.

Judge Mason was succeeded by that eminent patriot and statesman, Hon. Joseph Holt, whose administration of the Patent Office was so distinguished that, upon the death of Gov. Brown, he was appointed to the office of Postmaster-General of the United States. Soon after entering upon his new duties, in March, 1859, he addressed to us the following very gratifying letter:

MESSRS. MUNN & CO.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you discharged your duties as Solicitors of Patents, while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and I doubt not justly deserved) the reputation of energy, marked ability, and uncompromising fidelity in performing your professional engagements.

Very respectfully, your obedient servant,

J. HOLT.

Hon. Wm. D. Bishop, late Member of Congress from Connecticut, succeeded Mr. Holt as Commissioner of Patents. Upon resigning the office he wrote to us as follows:

MESSRS. MUNN & CO.:—It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency; and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully, your obedient servant,

WM. D. BISHOP.

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Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent, free of charge. Address MUNN & CO., No. 37 Park Row, New York.

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HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by a draft on New York, payable to the order of Messrs. MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row, New York.

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The Patent Laws, enacted by Congress on the 2d of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners, except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

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Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The Government fee for a caveat is $10. A pamphlet of advice regarding applications for patents and caveats is furnished gratis, on application by mail. Address MUNN & CO., No. 37 Park Row, New York.

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Many valuable patents are annually expiring which might readily be extended, and if extended, might prove the source of wealth to their fortunate possessors. Messrs. MUNN & CO. are persuaded that very many patents are suffered to expire without any effort at extension, owing to want of proper information on the part of the patentees, their relatives or assigns, as to the law and the mode of procedure in order to obtain a renewed grant. Some of the most valuable grants now existing are *extended patents*. Patentees, or, if deceased, their heirs, may apply for the extension of patents, but should give ninety days' notice of their intention.

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Notes and Queries

H. R., of Md.—The method to which you refer, of making cloth waterproof consists in dissolving one ounce of alum and an equal quantity of the sugar of lead in one gallon of water, then allowing the sediment to fall to the bottom of the vessel. Now take the clear liquid, warm it, immerse the cloth in it and hang it up to dry, after which it will repel water, but air will pass through it freely. We do not advise you to immerse your overcoat in this liquid, still it will do it no harm, but it will take about five gallons for a soldier's overcoat. It is not so perfectly water-proof as an india-rubber composition.

A. J. C., of Ohio.—Pure silver will become dark brown on the surface, if dipped into acetic acid and then exposed to the atmosphere.

G. S. L., of N. H.—If you intend to become a civil engineer it would be best to enter a locomotive shop as an apprentice.

M. M. D., of N. Y.—We do not at present know where you can obtain machines for making round matches. We presume this reply will attract the attention of some one engaged in the business, who will at once advertise in our columns.

J. F., of Ill.—The article you send us about the natural history and habits of the steam engine is very well written but is not suited to the character of the SCIENTIFIC AMERICAN, and we must decline it. Write something more practical and we shall be pleased to examine it.

L. H. P.—Locomotive cylinders are made of various diameters, the most general are from 18 to 20 inches by the same length of stroke. Some very heavy locomotives have 22-inch cylinders, and we think there is one in this country which has 26-inch cylinders.

J. R. S., of N. Y.—You ask "why do blockade-runners use soft coal." We answer because they can't get hard.

R. P., of Mass.—No dies for cutting screws will stand in the way you temper them. Plunging a die into cold water makes it as brittle as glass. Heat to a cherry red then plunge the work into cold water and after this "draw" the temper on a hot iron bar till the color is a good yellow.

T. H., of Conn.—To enable us to form an opinion of your alleged improvement in looms, something besides a mere description of it will be necessary. We cannot judge rightly of its mechanical arrangement without the aid of either a sketch or model. It does not appear, from the description you give of it, that it accomplishes more than other looms now in use. In this, however, we may be mistaken.

G. C., of Ohio.—Among the great variety of substitutes for the crank which have been invented, none as yet have equalled it in simplicity and effectiveness. We know not what your plan is, but will examine it, if you will forward to us a sketch and description for that purpose.

H. B., of Wis.—Overman's work on the manufacture of iron, published by H. C. Baird, Philadelphia, will give you the information desired, respecting cupolas, &c.

G. N. S., of Penn.—Soap bubbles may be made by inflating them with hydrogen gas, when upon the application of a piece of lighted paper, each bubble will burst with a vivid flash of light. The gas is forced through the solution of soap from the neck of a bag containing it. If the bubbles are inflated with a mixture of oxygen and hydrogen gases, they will explode with a loud report when ignited, but such experiments are more curious and dangerous than useful.

G. F. C., of Mass.—By boiling cider and adding to it some pieces of charcoal, its musty taste will be removed. But as you intend to bottle your cider, it may be as well to proceed without regard to its taste. Some persons are fond of a slight musty taste in wines.

A. B., of Mass.—A bath composed of one-part of hydrochloric acid to ten of water, will answer for cleaning your brass castings. They should be dipped into an alkaline solution after being put into the acid, and washed and dried before being lacquered. You can purchase bronze powders of different colors, wherever painters materials are sold.

J. E., of Wis.—You can get a good farm barometer from L. Woodruff, of Ann Arbor, Mich. The words on dial plates of barometers, "Fair," "Rainy," &c., are entirely unreliable. In order to derive any benefit from the barometer you must observe the changes in accordance with the printed directions which Mr. Woodruff will furnish you.

J. L., of Penn.—That petroleum is the result of chemical decomposition of vegetable matter is not doubted by our best geologists. When vegetable matter is subjected to heat apart from the air, it undergoes destructive distillation; the elements of which it is composed, being separated and combined in new ways, producing a very great number of new substances. These vary with the conditions under which the distillation takes place, and especially with the temperature. Petroleum occurs in rocks of various ages, from the lower silurian to the tertiary.

T. D. W., of Ill.—We advised you to blow the steam directly from an open nozzle under water into your bath, and we adhere to that opinion. If time is no object you can heat water more economically by passing steam through a coil in the tub, but the first plan is the quickest. You can also heat the water in the boiler directly and blow it into your vat, but this plan takes more time and is costly. If your boiler gets coated with scale, throw in a pound of powdered slippery elm and it will remove it.

W. K., of Ill.—We do not think your plan for shelling the enemy from balloons would work. The wind is no respecter of balloons, and as you say there must be a current blowing toward the enemy to operate the plan, you would experience difficulty in raising the wind to suit circumstances.

Money Received.

At the Scientific American Office, on account of Patent Office business, from Wednesday, Feb. 3, 1864, to Wednesday, Feb. 10, 1864 :—

R. H. F., of N. Y., $12; J. C., of N. Y., $25; C. W. K., Jr., of N. Y., $10; C. E. M., of Vt., $20; J. P. B., of Ill., $20; W. D., of N. Y., $16; P. H. G., of N. Y., $16; W. H. J., of N. Y., $16; C. J. B., of Ill., $45; E. H., of Mich., $46; A. K., of N. Y., $16; G. B., of N. J., $20; J. N. C., of Ohio, $16; O. C. McC., of Ohio, $25; W. H., of Iowa, $16; J. H., of England, $15; J. S. McC., of N. J., $25: J. R. G., of Ill., $25; F. M., of Mo., $16; A. B. L., of Conn., $30; J. O. G., of Ill., $16; W. & A., of N. Y., $20; A. B., of N. J., $16; O. P., of Vt., $20; H. S. B., of La., $65; S. E., of Pa., $16; H. A. B., of Pa., $15; J. W. D., of Mich., $15; J. T., of N. Y., $25; T. B., of N. Y., $30; W. U., of Ohio, $150; W. & A., of N. Y., $16; J. H., of Mass., $20; J. G., of Ind., $48; J. W. D., of N. Y. $20; J. M., of N. Y., $16; P. G., of Mo., $20; D. W. C. W., of N. Y., $20; G. C., of Conn., $20; S. Z., of N. Y., $16; C. A. C., of Pa., $16; A. W. G., of Mass., $16; G. A., of Iowa, $25; A. J. A., of Mich., $20; I. L. Q., of Pa., $25; R. C. G., of Va., $30; E. H. C., of Mich., $15; G. F., of Conn., $25; J. A. H., of Maine, $16; J. P., of N. Y., $40; F. C. P., of N. Y., $41; E. L., of Vt., $20; H. P., of N. Y., $16; P. A., of N. J., $20; A. J. F., of Vt., $16; O. M. F., of Pa., $19; W. H. B., of Ill., $50; A. Van B., of N. Y., $25; A. S., of N. Y., $25; J. L. K., of Pa., $20; H. M., of Ill., $45; E. L. P., of N. Y., $45; H. K. J., of Conn., $45; W. H. McM., of N. Y., $16; W. C. M., of N. Y., $20; P. B., of N. Y., $22; E. Y., of Mich., $20; H. N. T., of Vt., $15; L. L., of Ohio, $25; H. & S., of Pa., $16; B. L. M., of Conn., $25; S. J. W., of N. Y., $16; C. D., of Minn., $12; A. S., Jr., of Iowa, $16; L. H. C., of Ill., $20; F. B. P., of Mo., $19; T. C., of Conn., $25; J. M., of N. Y., $25; P. H. G., of N. Y., $25; J. W., of Mo., $20; J. D. McL., of N. Y., $16; M. V. C., of Mass., $25; W. & M., of N. Y., $16; L. H., of Cal., $18; O. W., of N. Y., $16.

Persons having remitted money to this office will please to examine the above list to see that their initials appear in it and if they have not received an acknowledgment by mail, and their initials are not to be found in this list, they will please notify us immediately, stating the amount and how it was sent, whether by mail or express.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office, from Wednesday, Feb. 3, 1864, to Wednesday Feb. 10, 1864 :—

T. B., of N. Y.; J. C., of N. Y.; J. T., of N. Y.; R. H. F., of N. Y.; H. W. C., of Vt.; P. B., of N. Y.; H. L., of Iowa; C. D., of Minn.; F. B. P., of Mo.; G. F., of Conn.; N. A., of Ohio; A. B. L., of Conn.; J. R. G., of Ill.; J. L. Q., of Pa.; B. L. M., of Conn.; J. S. McC., of N. J.; R. C. G., of W. Va.; W. & P., of N. Y.; G. A., of Iowa; O. C. McC., of Ohio; L. S., of Ohio; W. & H., of Cal.; J. P., of N. Y.; J. M., of N. Y.; H. M. H., of Pa.; S. G. R., of N. Y.; G. A. M., of N. Y.; W. & A., of N. Y.; F. C. P. of N. Y.; P. H. G., of N. Y.; M. V. C., of Mass.; G. W. R., of R. I.; H. S. B., of La.

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DEPARTMENT OF AGRICULTURE,
WASHINGTON, D. C., Dec. 15, 1863.

To the Growers and Manufacturers of Flax and Hemp :

THE COMMISSIONERS APPOINTED BY THIS DEpartment, consisting of Hon. J. K. Morehead, of Pennsylvania, William M. Bailey, of Rhode Island, and John A Warder, of Ohio, to consider the following appropriation made by the last Congress, viz.:

"For investigations to test the practicability of cultivating and preparing flax and hemp as a substitute for cotton, twenty thousand dollars."

Having met, and after several days' investigation, believing that a further and fuller notice of their investigations might produce valuable results, adjourned to meet again on Wednesday the 24th day of February next, at 12 o'clock, M.

They request all interested in the distribution of this appropriation, or anxious to develop the subject for the public good, to send to this Department, on or before that day, samples of the hemp and flax in the different stages of preparation; of the fibers and fabrics prepared by them, accompanied by statements of the various processes used, and the cost of production in each case; also, descriptions of the kind and cost of machinery used, where made, &c., together with any and all information that may be useful to the Commission.

This information is necessary before an intelligent distribution of the appropriation can be made. ISAAC NEWTON.
1 9 Commissioner.

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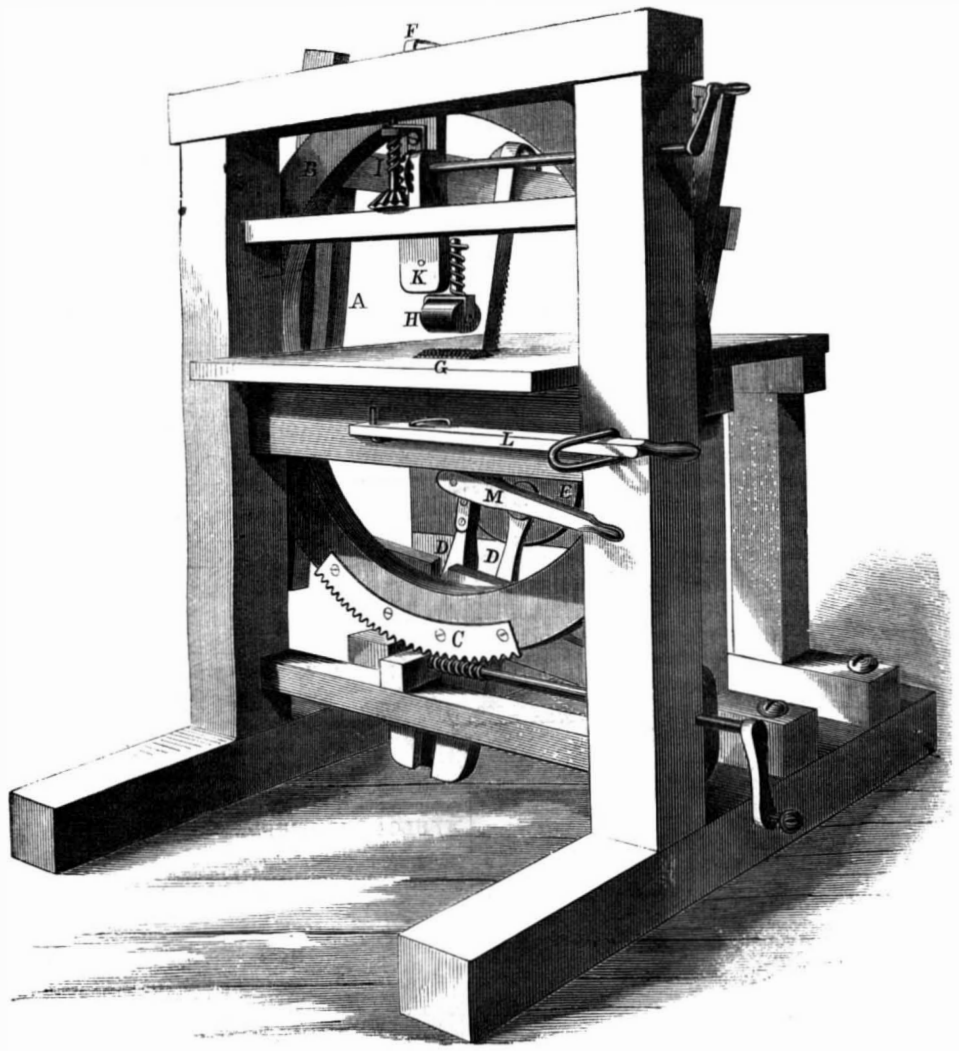
Improved Saw-mill.

The improvements which have been introduced in the art of sawing lumber, have almost revolutionized the trade within a few years. In place of the simple upright, jig, or muley saw-mill capable of moving only in a vertical direction, we have machines which, by the aid of ingenious attachments, can be made to perform work hitherto deemed unattainable. Of course these changes add very greatly to the efficiency of the mills, and we are pleased to notice that the work of improvement still goes on. In the accompanying engraving we present a view of a saw-mill which, in addition to the features usually obtained in machines of its class, is capable of adjustment laterally; this enables the sawyer to dress out ship timber, chair stuff, or, in short, any kind of work that is irregular in outline. This is accomplished by hanging the saw in a frame, A, as usual, and placing said frame upon another bed or ring, B, which has a motion around an imaginary center, communicated to it by the worm and arc, C, at the bottom; said apparatus being actuated in the manner shown in the engraving. The saw itself is driven by belting through the pitmans, D, attached to the face plate, E; the lower end of said pitman being attached to the saw frame, as usual, and, in connection with a second rod, operates the saw.



KNOWLTON'S SAW-MILL.

In the engraving the saw and frame is shown diverted from a true line, in order to give the reader a better idea of the capabilities of the machine. The face of the ring, B, is provided on the side opposite the reader with a graduated scale, which is furnished with an index-finger, one portion of which can be seen at F, on the top of the machine; this enables the workman to see exactly at what angle the saw is working, and it also aids him in recording the work done, so that at any future time he can execute an order for timber cut exactly to the same angle as the original pattern.

The feed and friction rolls, G and H, are the subject of a special application for a patent. This portion of the apparatus is peculiar in that the feed roller can be thrown out of contact with the log by the lever, M, and also that it always feeds in a line with the saw-cut, thus creating no extra labor to keep the cut true; it is also grooved so that the timber cannot slip laterally or sideways, and thus cause the saw to diverge from its proper direction. The friction roller is designed to keep the log steady upon the table, and can be raised or lowered by the screw, I, moved by the bevel wheels, through the agency of the crank, J; this roller being on the upright, K, of course moves as it is moved.

The adjustment of the feed roller to suit the ever-varing direction of the saw-cut, in curved work, is performed by the lever, L; the roller itself being upon a shaft which admits of vibratory motion (by peculiar bearings not easily shown in the engraving), as it were, back and forth, so that the alteration of the work on the table can be met by adjusting the feed-roller, so that it is always at right angles with the saw-cut. These desirable features are all obtained in the compact and simple machine shown in the engraving.

The inventor, John L. Knowlton, obtained a patent for the adjustable saw-frame, on Oct. 30, 1863, and another patent is ordered to issue on the feed roller and its adjuncts. Both cases were obtained through the Scientific American Patent Agency. Patents are also pending in Europe through the same source. For further information address Knowlton, Smith & Co., Reed-street wharf, Philadelphia, Pa.

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THE
Scientific American,
FOR 1864!

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